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System of the 121<sup>st</sup> Combat Support  
Hospital to Determine an Optimal  
Appointing System

A Graduate Management Project Submitted  
to the Faculty of Baylor University in Partial  
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Degree

of

Master of Health Administration

by

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## ABSTRACT

Kissick's Iron Triangle provides a model for health care delivery which postulates that the three goals of healthcare: quality, access, and cost containment cannot be simultaneously achieved. This is directly at odds with the latest continuous process improvement technique of Lean Six Sigma (faster, better, cheaper) which proposes that cost (cheaper) and quality (better) will increase if you increase access (faster) (MoreSteam University, 2006). A centralized appointing system may be a method to increase access and quality while decreasing cost. The 121<sup>st</sup> Combat Support Hospital utilizes a centralized appointing system for primary care appointments while specialty care appointments are handled directly by the clinics. The purpose of this study is to take advantage of a unique opportunity to compare and contrast cost, quality, and access thereby assessing the effectiveness of a centralized appointment system in a single catchment area. By examining how the current appointment systems work and how they are designed to work, it will be possible to determine the best appointing system (centralized, decentralized or a melding of the two systems to establish a hybrid structure) that will improve patient care by enhancing access and quality while decreasing cost.



## Introduction

On December 21, 1991 representatives of the Soviet republics signed the Alma Ata Protocol thereby affecting the dissolution of the Soviet Union and the end of the Cold War. With the Warsaw Pact now defunct and the end of the Soviet Union, the single largest military threat to the United States and its allies in Europe and Asia was gone. As the ramifications of those developments became clearer, policymakers concluded that the national security strategy of the United States would not be adversely affected by a major reduction in U.S. forces. Consequently, between 1989 and 1999, the numbers of active-duty military personnel as well as civilian Department of Defense (DoD) employees were reduced by approximately 34 percent. The magnitude of the reductions is illustrated by the changes to major elements of the force structure: the number of active Army divisions decreased from 18 to 10, the number of battle force ships in the Navy went from 566 to 317, and the number of fighter-air-wing equivalents in the Air Force declined from 37 to 20 (Congressional Budget Office, 2000). In addition, the Congressional Budget Office also recommended downsizing the military medical system by reducing the number of beds in military facilities, converting military hospitals to outpatient clinics, closing some facilities, and reducing the number of active duty physicians. This would allow the Military Health System (MHS) to reduce costs to the tune of \$28 billion over 10 years (Congressional Budget Office, 2000). With no large scale conflict or military threat on the horizon, a reduction in force made logical and economic sense. However, the events of September 11 2001, the invasion of Afghanistan on October 7, 2001 and 17 months later, the invasion of Iraq on March 20, 2003 significantly changed the contemporary operational environment. Suddenly, the military medical system was supporting a war on two fronts, Operation Enduring Freedom (OEF) in Afghanistan and Operation Iraqi Freedom (OIF) in Iraq while simultaneously

supporting the full spectrum of operations throughout the world and in the United States in support of the Global War on Terrorism (GWOT).

With the changes in the force structure of the military and the heightened pace of operations, the Army has established a concept of a smaller and more agile force. This concept is based on the Army's vision which was established by then Army Chief of Staff General (retired) Eric K. Shinseki: Soldiers on point for the nation...persuasive in peace, invincible in war. The objective of this "transformation" is to "create strategic dominance throughout the entire spectrum of operations." Seven broad goals have been identified to achieve the Army's transformation. The Army must become more responsive, deployable, agile, versatile, lethal, survivable, and sustainable (Steele, 2001). Army medicine has responded to this new vision by establishing the Medical Reengineering Initiative (MRI). This initiative will provide the Army with the modular organizational structure that supports the current force, a mixed force—made up of Stryker Brigade Combat Teams—infantry, and mechanized and armored units. Additionally, MRI puts a medical organizational force structure in place that will provide a bridge to the Army's Future Force. Unit designs that are modular, scalable and possess standardized medical capabilities packages that can be easily deployed to areas of operations throughout the globe exemplify the versatility gained through MRI (Lugo, Normile, Murphy, and Wild, 2004). As the Army Medical Department (AMEDD) moves to implement the MRI concept, units at the tactical level are also examining their organizations to determine if the structure enables mission accomplishment. This has directly led to the 121<sup>st</sup> Combat Support Hospital (121<sup>st</sup>CSH) transforming itself and surrounding units to become a Medical Department Activity (MEDDAC) to better support the Army medical mission in the Korean theater of operations. A combat support hospital is a standard Army field medical unit whereas a MEDDAC is traditionally a fixed facility. The



MEDDAC will also continue to coordinate for care provided by Korean host nation medical facilities for care that is not available at the MEDDAC but does not require that the patient be medically evacuated back to the United States.

#### Controlling the Rising Costs of Healthcare

In 1960, only 5.2% of the United States GDP was taken up by healthcare. However, by 2005, the United States spent \$1.9 trillion (16% of GDP) on healthcare. This compares to a median of 8.5% for the Organization for Economic Co-operation and Development (OECD) countries. Presently, the United States spends more on healthcare than on food (Angrisano, C., Farrell, D., Kocher, B., Laboissiere, M., Parker, S., 2007). According to the McKinsey Global Institute, an overriding cause for the high healthcare costs in the United States is the failure of the third party payor system to provide incentives to patients and consumers to be value-conscious in their demand decisions and their inability to establish the necessary incentives or mandates to promote the rational supply of healthcare by providers. In effect, physicians or other healthcare providers are seeing patients that do not need their level of healthcare because of the financial incentive available due to seeing a large number of patients, or patients are demanding to be seen for medical concerns that they may be able to handle without the intervention of a provider. The MHS is facing these same issues. According to DoD data, the annual cost of military healthcare has more than doubled from \$19 billion to \$39 billion since 2001 because of the aging beneficiary population and the skyrocketing costs associated with medical care. By 2015, the costs of healthcare will probably exceed \$64 billion. Spending 12% of the defense budget on military healthcare will take away valuable resources that may result in erosion of the readiness of combat troops (Colarusso, L.M., Bender, B., 2007).

To gain an understanding of the reasons and requirements that are leading to the increasing costs of healthcare, the Army uses many different resources to track manpower, workload, and expenses. To help with determining the appropriate manpower needed by a Military Treatment Facility (MTF), the Manpower Division of the Health Care Operations Directorate, United States Army Medical Command developed the Automated Staffing Assessment Model (ASAM). The model applies only to fixed MTFs and not field units. The ASAM was implemented in January 1997 because it was perceived to have fewer flaws than the previous method that was used. The old method used benchmarks developed through correlation and regression analysis while the ASAM is a computerized spreadsheet that utilizes data from existing data sources (MEDCOM, 1997).

Congress also realized that the spiraling healthcare costs for military medical care must be contained. Therefore Congress enacted the National Defense Authorization Act (NDAA) of 1994 (Library of Congress, 1993). The NDAA mandated the implementation of health programs modeled on managed care plans in the private sector. To meet the requirements established by DoD and Congress, the MHS developed a military managed care plan known as TRICARE. Beneficiaries were given the ability to choose from three managed care options: TRICARE Prime, TRICARE Standard, or TRICARE Extra. TRICARE Prime is like an HMO and each enrollee is assigned a primary care manager (PCM) and agrees to coordinate all care through their assigned PCM. TRICARE Standard is similar to a fee for service plan which does not require enrollment. Beneficiaries have the ability to see any provider. However costs are higher for this option. Finally, TRICARE Extra is comparable to a civilian preferred provider organization model. Beneficiaries may utilize a preferred network of providers at a lower cost but have the option of visiting out of network providers. Evidence suggests that the advent of

TRICARE has achieved cost containment and quality improvement (TRICARE Stakeholder's Report, 1999).

Another method that has been shown to decrease costs and enhance quality is the electronic health record. The Institute of Medicine (IOM) Quality in Healthcare Committee concluded in their report "To Err Is Human" that as many as 98,000 Americans die each year from preventable medical mistakes that they experience during hospitalization (Karlson & Johannesson, 1998). It is estimated that the financial cost of these errors is between \$37.6 billion to \$50 billion and as much as \$300 billion is spent on care that does not improve patient outcomes (Bush, 2004). During the State of the Union Address, President Bush (2004) highlighted the importance of the electronic health record. "By computerizing health records, we can avoid dangerous medical mistakes, reduce costs, and improve care." As technology became more prevalent throughout society, healthcare leaders also decided to leverage technology in the form of the electronic health record to provide higher quality outcomes and patient satisfaction while decreasing overall cost (Bria, 2006). The Composite Health Care System (CHCS) was DoD's initial health record system. While it was introduced in the 1980s, additional features were continually added and changes requested by users were instituted throughout the life of the system. Capitalizing on the experience gained with CHCS, DoD is currently instituting a new health record system known as the Armed Forces Health Longitudinal Technology Application (AHLTA). This application was previously known as CHCS II until the Assistant Secretary of Defense changed the name (Department of Defense Inspector General, 2006). As the next generation medical and dental clinical information system, AHLTA will produce and maintain a life-long comprehensive electronic health record of each beneficiary. The system is designed to work in fixed facilities as well as in a specific theater of operations.

### Conditions Which Prompted the Study

The United States Forces Korea (USFK) leaders are transitioning forces in South Korea from the combat mindset to a mindset of 'normalcy.' This will result in service members being able to come to South Korea for a three year tour with their families instead of the current one year tour without their families. In a recent speech on November 2<sup>nd</sup>, 2007, the USFK commander stated that he recently authorized the doubling of command sponsorship for soldiers assigned to the Korean peninsula from the current 3000 slots to 6000 slots. Typically, soldiers are assigned to South Korea for a one year tour without family however some soldiers are able to obtain command sponsorship which increases the tour length to two years and allows the soldier to bring along family members. With three year tours and the additional command sponsorship, planners should prepare for the increase in medical care requirements to support this population.

The 121<sup>st</sup>CSH is located in Seoul, South Korea at the United States Army Garrison in Yongsan. It serves as the hub for Army medical care throughout South Korea. Just as transformation is occurring throughout the military, the 121<sup>st</sup>CSH is transitioning into a MEDDAC with overall responsibility for Army medical care on the peninsula. This provides an impetus and opportunity to make changes to the system that will positively affect healthcare. Several studies have shown that while managed care can decrease cost, this typically comes at the expense of access and quality (Van Voorhees, et al. 2003. Norquist, G. S., Wells, K. B. 1991. Weissman, E., Pettigrew, K., Sotsky, S., Regier, D.A., 2000. Heflinger, C. A., Northrup, D. A. 2000). With the emphasis on ensuring patient satisfaction and standard of care in medical treatment, it will be critical to ensure that the consolidation of the medical mission and transition to a MEDDAC does not lead to access barriers for patients. Several clinical sections have already reported a disparity between patient appointing and provider availability. This has led to patients



presenting for appointments with no provider to see them or providers with open appointments that are not slotted. If this disconnect is not addressed, it is likely that this problem will get worse after the transformation to a MEDDAC and the additional burden due to the increase in military families in the Korean theater of operations. This may directly affect six (agile, deployable, responsive, survivable, sustainable, and versatile) of the seven goals identified by GEN (R) Shinseki as necessary to ensure the military is able to handle full spectrum operations.

Kissick's Iron Triangle has been used by civilian healthcare leaders for over a decade to guide strategic plans, visions, and mission statements. Optimally, it is every healthcare leader's intent to deliver high quality care, while increasing access to services, while simultaneously lowering costs. However, as healthcare leaders try to make improvements in one area, there is often a trade off consideration in another area. For instance, increasing access to pharmacy benefits by opening an afterhour's pharmacy window may improve access and be seen as a quality initiative; however, may not generate enough revenue to pay for itself. As a result, civilian healthcare leaders must make careful executions with new policy ideas or agendas in order to maintain an effective balance between healthcare costs, quality and access. The same has not always been true in the military healthcare system (Kongstvedt, 1995).

The MHS operates in a unique cost environment. MTFs operate in a typical government fiscal bureaucracy. Under this paradigm, healthcare dollars are allocated to the MTF at the beginning of the fiscal year on 1 October. The hospital commander, (equivalent to a civilian hospital CEO), is then incented to spend all the allocated monies prior to 30 September of the following year. Under this federal bureaucracy and paradigm, military health leaders have little incentive to conserve resources, seek synergies or save money. All money not used by 30 September of the fiscal year is lost. Commanders and healthcare leaders failing to spend all of their allocated



dollars may be considered poor financial managers under this paradigm. However, a significant advantage of this philosophy is that MTFs are able to consider aspects of quality and access over costs in many cases (Kongstvedt, 1995). With Operation OIF and OEF requiring a significant portion of the military's resources, all aspects of the armed forces have been pressed to decrease costs so that those resources may be utilized for the GWOT. The Army and the AMEDD have been using multiple performance improvement processes to, at a minimum, maintain quality while decreasing costs (benchmarks, Total Quality Management, Continuous Quality Improvement, Continuous Process Improvement, FOCUS-PDCA, Army Performance Improvement Criteria, and Lean Six Sigma). As part of these performance improvement processes, the AMEDD implemented the Performance Based-Adjustment Model (PBAM) in 2004 (Kiley, 2004). The PBAM moves the AMEDD from traditional budgeting to a system that financially rewards high-performing organizations. This provides incentives for MTFs to engage in best business and industry-standard wellness practices. The previous Army Surgeon General's (LTG Kiley) vision is that the PBAM will help to show that the AMEDD can provide better value and cost savings than private sector care (Kiley, 2006). The ultimate goal being to reward facilities that can demonstrate quality care. Patient satisfaction with the telephone system, and by proxy quality, is assessed within the provider scorecard. The actual patient satisfaction scores from the telephone appointing system are measured by the Army Provider-Level Satisfaction Survey (APLSS). This survey consists of 21 questions that are mailed to a patient within two days of their appointment. Non-respondents receive a second mailing three weeks after the first questionnaire is mailed out. Three of the 21 questions asked in the survey are designed to measure patient satisfaction with the telephone appointing process (questions 9, 10, and 11). Unfortunately, the 121<sup>st</sup>CSH has consistently had low patient satisfaction scores in this area.

Over the past year, 64.4% of patients have been satisfied with the overall phone service, 64.9% have been satisfied with how well their needs and schedule were taken into consideration when the appointment was scheduled, and only 60.1% of patients were satisfied with the amount of time between scheduling the appointment and the actual visit.

Since the 121<sup>st</sup> CSH is a service organization, it must meet the needs of its customers and patients with the limited resources available (human, financial, and technological).

Administrators and medical personnel are typically left with the hard choice of determining how resources will be used to maximize the benefit for the most number of patients. With the concerns about access and the push to reduce costs, an area of concern has been the patient appointment process. There has been much debate about the benefits of a centralized appointment system. Central appointments can offer several potential benefits. One major benefit is that all clerks can be cross trained to handle multiple functions instead of being focused only on a specific clinic or section. Cross training will also help to prevent burnout by providing staff with a change of pace. A shortage of the appropriate personnel has lead to longer waits, delays in obtaining needed services, and a decline in receiving the appropriate care since patients may chose to forgo care due to the difficulties in obtaining care (Pearson, 2006). By centralizing patient appointments, all clerks can be cross-trained to provide coverage when necessary. The administrative benefit of centralizing is that all clerks will be similarly trained. This will increase the likelihood that all processes and procedures are similarly conducted thereby allowing a methodology to support any increase in demand for a certain function or a change in requirements. In addition, the economies of scale that can be attained will help to decrease costs. Instead of one clerk for each specialty clinic, one clerk may be able to handle the appointing process for two or more clinics. This will enable administrative personnel to handle other tasks

which may currently be left uncompleted. It will be critical to ensure that as these economies of scale are established that staff is utilized for other administrative or clinical tasks. Lack of appropriate staff utilization and documentation of workload could lead to an ASAM mandated reduction in staffing. However, centralized appointments also create some concerns for the healthcare system. Healthcare providers lose direct control over scheduling of appointments. In addition, centralized appointment clerks may not be aware of the appropriate time to schedule patients depending on the type of appointment. A generic one-size fits all approach to scheduling of appointments may be established. Finally, it may become more difficult for patients to schedule appointments with a particular provider. These issues can lead to decreased patient satisfaction with the telephone appointing process. Healthcare administrators must ensure that providers have oversight of their schedules and appropriate training is provided to the appointment clerks

Cost containment has been a significant driver in healthcare for some time. However, as administrators and clinicians have increasingly gained a greater acumen about the business of healthcare they have realized that cost effectiveness is an appropriate strategy while cost containment alone will likely lead to a decrease in quality and access. A centralized appointing system may enhance effectiveness of the entire organization by allowing trained personnel to schedule the appointments, by freeing up clinic personnel to focus on the qualitative side of patient care, and by providing patients with one source for all appointment issues. Such an initiative would fit into the puzzle as healthcare organizations move away from cost containment strategies and into cost effective strategies.

A significant driver for improving the patient appointing system is the goal of achieving TRICARE standards for access. The access standards break down patients into four different

categories: emergency, urgent, routine, and specialty/wellness. TRICARE standards for emergency care state that emergency services are available and accessible within the TRICARE Prime service area 24 hours a day, seven days a week. (Understanding TRICARE's Access Standards, 2007). The access standards for the other three categories are simply explained; One day for urgent care, seven days for routine care, 28 days for specialty or wellness care, 30 minutes or less in the provider's waiting room, and 30 minutes or less travel time to the primary care provider's office (TRICARE, 2007) (See Appendix A for a detailed explanation of the categories). Any appointment system used for scheduling patients must be able to assist in monitoring and tracking of referrals and appointment dates to ensure that TRICARE access standards are met. It falls on healthcare administrators to explore opportunities to ameliorate the increasing demand for healthcare and the increasingly difficult time patients have in accessing appointments they need (Pricewaterhousecoopers, 2002).

#### Appointment Systems at the 121 CSH

Primary Care, Internal Medicine, Dermatology, and Neurology utilize a centralized appointment system while appointments for all other clinics are handled by the clinic staff. The process for getting an appointment is the same for those clinics that utilize the centralized appointment system. However, for those clinics that schedule their own appointments, the process is similar but slightly different for each clinic.

For centralized appointments at the 121<sup>st</sup> CSH, patients call a central number for an appointment. Because there are four phone lines that are available for patients to call, patients rarely experience a busy signal. Once a patient calls, they are added to a queue of patients waiting to be assisted by an appointment clerk. The system used to queue the patients can stack a maximum of 50 patients in the waiting queue. Currently, there are two appointment clerks with



authorization for a third appointment clerk. In situations where the queue is getting too long, the clerk supervisor can also assist in fielding patient calls for appointments. As the number of personnel staffing the phones increases, the wait times for scheduling an appointment and the number of patients waiting in the queue should decrease. Typically, based upon how quickly the patient needs to be seen, the patient is slotted for an urgent or routine appointment. However, at the 121<sup>st</sup>CSH, the previous Deputy Command for Clinical Services (equivalent to the Medical Chief of Staff at civilian facilities), made the decision to slot all patients as urgent to ensure they are seen quickly. This helps to ensure that there are not appointment slots for routine patients that are not used just because the patient is not classified as routine. In some sense, this is a shadow of how open access is supposed to work. Since appointments are made in CHCS, the clerk also verifies and updates demographics to ensure contact information is accurate.

Patients being slotted for a procedure can not typically be scheduled for the same day. Two days prior to the scheduled procedure, the patient receives an automated phone call reminding them of their appointment or procedure. Because scheduling of appointments is centralized, the front desk staff at the clinic are able to focus on greeting, checking in, and handling telephone consults for the patient. Due to staffing issues, the appointment clerks do not typically handle telephone consults. With additional staff, this function may also be handled by the appointment clerks thereby giving the front desk staff more time to focus on the patient at the point of care. If there are no appointment slots available, the patient can be referred to a host nation facility. If a referral is necessary, a consult is forwarded to the TRICARE office.

#### Decentralized Appointment System – Specialty Care

A few examples of how patients are scheduled for appointments in the specialty clinics are reviewed below.



### Orthopedics/Podiatry

Patients needing to be seen by Orthopedics/Podiatry are referred by primary care, physical therapy, or through the Emergency Room (ER). Referrals may be entered in CHCS or AHLTA. All referrals are reviewed by providers in the clinic using CHCS. Once reviewed, the appointment clerk prints the referral and places it into a file until the patient calls the clinic. When the patient calls the clinic, they are scheduled by the appointment clerk based on the instructions of the provider. If a patient does not call the clinic within three days, the appointment clerk will attempt to contact the patient. Three attempts are made to contact the patient, after which all available documentation is placed in a file for record keeping. An issue of concern for the clinic is that there is no process to monitor the number of patients that are not contacted and scheduled for an appointment. Appointment clerks are also responsible for handling the administrative paperwork, documenting telephone consults for provider intervention, establishing waiting lists and calling patients on the waiting lists.

### Physical Medicine/Physical Therapy

Any patients that need to be seen by the Physical Medicine/Physical Therapy clinic must have a referral from primary care or be walked-in secondary to an ER visit. Once the referral is received, the OIC (Officer in Charge) of the clinic prints the referral from CHCS and reviews it for appropriateness. If the patient is deemed to need Physical Medicine/Physical Therapy intervention, the OIC provides instructions to the clerk on the printed referral. At that time, the appointment clerk contacts the patient to schedule the appointment. If the clerk is unable to contact the patient, any information gained and all attempts are documented on the referral. For example, if the phone number listed in CHCS is inaccurate, that information is annotated on the referral. Three attempts are made to contact the patient. Documentation for patients that the

appointment clerks are unable to reach is maintained in a file. Once contact is made with the patient, the clerk books an appointment for the patient. On the day of the appointment, the clerk checks in the patient using AHLTA. Additionally, walk-ins as well as telephone consults for prescription refills or other minor patient care issues that require intervention by a healthcare provider are also documented in AHLTA by the appointment clerk. The appointment clerk is also responsible for greeting patients and fielding phone calls in the Physical Medicine/Physical Therapy clinic.

### EENT Clinic

All patients seen at the EENT clinic are received through referral from primary care or as walk-ins from the ER. The OIC receives the referral and determines if the patient requires a surgical intervention. Patients requiring surgical intervention are assigned to the single EENT surgeon assigned to the 121<sup>st</sup> CSH. All other patients are seen by the other provider that does not perform surgeries. At this point, the appointment clerk contacts the patient to schedule an appointment. Three attempts are made to contact the patient. If contact is not made, the referral is placed in a folder with the appropriate information as to why the clinic was unable to contact the patient for documentation purposes. The EENT clinic uses CHCS to schedule appointments, handle telephone consults, and check in patients. In addition, patients are asked to review a patient data form and update allergies, medications and make any changes or updates that are necessary. Either prior to the patient's arrival or once the patient arrives, the appointment clerk pulls any test results or labs and also updates the patient data form. Once updated by the appointment clerk and the patient, the form is given to the provider (see Appendix B for a sample form). When the provider is ready, the appointment clerk takes the patient to the exam room. Appointment clerks are also responsible for cleaning the room between patients, utilizing a

checklist to ensure appropriate medications and supplies are in each exam room, taking equipment to Central Materiel Supply for maintenance and repairs, performing user level maintenance on the equipment, and checking to ensure that medications in the exam rooms are not expired. Because appointment clerks are handling these other tasks, they may not have enough time to handle the volume of patients requiring appointments or these other tasks may take priority over calling and scheduling patients for appointments.

### TRICARE

On a daily basis, the TRICARE office prints referrals that are received from the clinics. Based on the type of care requested, the staff will determine the appropriate host nation facility to contact. In some cases, provider or patient preference determines which host nation facility receives the referral.

Once the host nation facility receives the fax from the TRICARE office, the patient is slotted for an appointment and the host nation facility calls the TRICARE office to contact the patient and inform her of the appointment date and time. On the day of their appointment, patients have the option of taking advantage of the daily shuttle that goes to the host nation facility or arranging for their own transportation.

### Primary Care Walk-Ins to the Emergency Room

In cases where no appointments are available, patients that feel they need to be seen will present to the ER (Flores, 1998. Gruntdoc.com, 2007). While this may be a quick fix for the lack of available appointments, it creates another issue where patients that require ER care may be delayed in receiving appropriate treatment. "On average, we probably get two walk-ins every day that really should have primary care appointments" (Baker, 2007).

## Statement of the Problem

The purpose of this study is to determine the optimal method for a patient appointment system for the 121<sup>st</sup> Combat Support Hospital's primary and specialty care clinics. In order to maximize the quality of healthcare patients receive, it is important to ensure that patients have access to needed appointments. This study will examine the effect on the time a patient waits to schedule an appointment because of the number of clerks that are available to schedule appointments, the type of appointing process used, and the number of phone calls received. Lack of patient access to appointments can act as an unintended gatekeeper leading to less than adequate healthcare. Lack of access to care has been shown to be strongly and independently associated with outcome (Haelterman, Ovist, Barlow, & Alexander, 2003). If appointments are unavailable because of capacity or scheduling an appointment is difficult, patients will seek other avenues for healthcare or will decide to seek care for their medical problem only if acuity increases. This can result in a first encounter for a condition at a point later in the disease course when the cost for treatment and cure is much higher (Boudreau, McNally, Rensing, & Campbell, 2004. Leddy, Kaldenberg, & Becker, 2003). Delaying care for their medical condition can result in adverse outcomes. This is an especially important consideration in chronic conditions. Patients with diabetes that do not control their blood sugar and are not conscientious about following up with their provider could end up with loss of vision or amputations of their extremities.

## Literature Review

Primary care can be defined as basic or general health care usually rendered by general practitioners, family practitioners, internists, obstetricians and pediatricians -- who are often referred to as primary care practitioners or PCPs; Professional and related services administered by an internist, family practitioner, obstetrician-gynecologist or pediatrician in an ambulatory



setting, with referral to secondary care specialists, as necessary (Plexis Healthcare Systems, 2007). However, the MHS describes primary care providers as family physicians, general internists, and general pediatricians (Office of the Secretary of Defense (Health Affairs), 1995). Primary care can also be defined as the provision of integrated, accessible health care services by clinicians who are accountable for addressing a large majority of personal health care needs, developing a sustained partnership with patients, and practicing in the context of family and community (Donaldson, Yordy, Lohr & Vanselow, 1996). Utilizing this definition, the Institute of Medicine organized a committee that identified several critical elements of primary care (see Appendix C for the complete list). When examining these elements, one can easily surmise that without access and integration, it would be quite difficult to meet the other five elements established by the Institute of Medicine committee. Regarding the provision of health care, measures of accessibility, availability and convenience are consistently associated with higher satisfaction (Atkins, et al. 2005). Access to care is defined as the ability to obtain needed, convenient, affordable, and effective personal health services in a timely manner (Shi & Singh, 2001). A key part of this definition that the MHS has continued to have problems with is the timely manner (Karta Technologies, 2005. Bonilla, 2003).

The method of appointing in which patient's call for an appointment on a first-come first-serve basis is currently being used by over 75% of primary care practices in the United States and is characterized by saturated schedules coupled with a large demand for care (Murray & Tantau, 1999). Hankins (2004) states that this type "of appointment system is designed around category descriptions of illness. Patients who call in to the physician's office for a same-day appointment compete against other patients for the appointment slot."

Historically, appointment problems have been resolved by the following methods



1. Increasing the number of telephone lines.
2. Obtaining call stacking/sequencing and answering mechanisms.
3. Installing automated appointment/scheduling systems.
4. Increasing staffing.
5. Decreasing turnover and increasing training of personnel.
6. Determining when to open and close appointment books.
7. Using waiting lists.
8. By having centralized instead of decentralized services (Brandler, 1983).

While these approaches have helped ameliorate appointment problems, they have also helped to create a burdensome bureaucracy. Access continues to be a problem for patients seeking healthcare (Goitein, 1990. "Waiting patiently (letter)," 1991). A 1999 survey by the Kaiser Family Foundation in insured adults younger than 65 found that 27% of people with health problems had difficulty gaining timely access to healthcare (Kaiser Family Foundation, 2000). Because patients are unable to obtain a primary care appointment, they will often frequent the emergency department at a hospital. As evidence of this phenomenon, 40 percent of emergency department visits are not urgent (Cunningham, Clancy, Cohen, & Wilets, 1995). The number of people reporting an inability to obtain timely access to appointment rose from 23% to 33% from 1997 to 2001 (Center for Studying Health System Change, 2002). Additionally, the Institute of Medicine's committee on quality care in America designated "timeliness" as one of the six key aims for improvement in healthcare in its landmark report *Crossing the Quality Chasm: A New Health System for the 21<sup>st</sup> Century*. Clearly, the healthcare system needs to examine other options for increasing access to patient appointments. Another approach for appointing patients that has gained favor in recent years is advanced or open access. In the open access model,

demand is determined by clinician availability not by clinical urgency (Murray & Berwick, 2003). Each clinician manages the demand for care from his or her patients without regard to urgency. Patients are almost always seen on the day that they call for an appointment unless they request to be seen on another day. If the provider is not in the office on that day, patients are given the option of waiting until their provider is available or seeing another provider on the day they call. This helps to maintain the open access model while also allowing patients to weigh their need for continuity of care against their need to be seen quickly. Ultimately, the patient makes the decision to wait for the appointment. Unfortunately, when clinicians are first presented with the open access model the typical reaction is an expectation that the clinicians and staff will be overcome by a never-ending demand by patients for more appointments. However, when open access was utilized at a Kaiser Permanente practice, the demand for appointments dropped by 10% after the new model was fully engaged (Murray & Tantau, 2000). When examined from the perspective of the customer, empirical data has shown that the costs of services are inflated by 30-80% due to processes that adds no value. Moreover, in service applications, the costs related to work that adds no value in the customer's eyes is higher than in manufacturing. With service operations now being more than 80% of GDP in the United States, it becomes even more important to ensure any process improvement is implemented with foresight and is evidence-based (George, 2003).

#### Purpose of the Study

Currently, at the 121<sup>st</sup>CSH, primary care appointments are centralized while most specialty care appointments are scheduled by clerks under the management of the clinic.

This project will review the wait times for patients that utilize either patient appointing process and make a determination on the best appointing system to use. The first independent

variable will be the type of appointing process. The second independent variable will be the number of staff available for the appointing system. The third independent variable will be the number of phone calls received. The dependent variable will be the wait times for patients to schedule an appointment.

The following hypothesis will be tested:

1.  $H_{a1}$ : Patient wait times to schedule an appointment are different for patients depending upon the type of appointment system utilized.

The null hypothesis is:

2.  $H_0$ : Patient wait times to schedule an appointment are the same for patients regardless of the type of appointment system utilized.

#### Methods and Procedures

This study will elucidate the wait times for centralized appointments and specialty clinics that are not currently using a centralized appointing process. Data will be collected from the Call Center Management Information System (CCMIS). The CCMIS is a system used by the 121<sup>st</sup>CSH that tracks the following metrics:

1. The number of phone calls received.
2. The number of phone calls answered.
3. The number of phone calls abandoned by patients (reason unknown)
4. The time spent with the appointment clerk to schedule an appointment.
5. The maximum time spent with a clerk scheduling an appointment during a particular week.
6. The time it took before the patient was able to talk with an appointment clerk.

7. The maximum time before a patient was able to talk with an appointment clerk for a particular week.
8. The time in which the patient abandoned the phone call (reason unknown).
9. The maximum time in which the patient abandoned the phone call for a particular week.

This information will be used to conduct an analysis of the current appointing systems and recommend a course of action for the 121<sup>st</sup>CSH appointing process.

#### Type of Analysis

The Statistical Package for Social Sciences 16.0 (SPSS) will be used for statistical analysis of this study. Descriptive statistics will be presented along with ANOVA to establish differences between groups. Summary data for the phone appointing systems will also be presented. The relationships between the variables discussed in the Purpose section can be explained with the following equation:

$$y = b_0 + b_1x_1 + b_2x_2 + b_3x_3$$

where y equals the dependent variable of wait times,  $b_0$  equals a constant,  $b_1$  equals coefficient for the predictor variable ( $x_1$ ),  $x_1$  equals the type of appointing system,  $b_2$  equals the coefficient for the predictor variable ( $x_2$ ),  $x_2$  equals the number of staff available to answer phone calls,  $b_3$  equals the coefficient for the predictor variable ( $x_3$ ),  $x_3$  equals the number of phone calls received. Values for all variables on the right side of the equation that will have a significant effect on wait times will be established.

#### Study Design

This descriptive study is designed to measure and compare two different phone appointment scheduling processes. The 121<sup>st</sup>CSH continues to have patient satisfaction issues with the



appointing process. Establishing the appointing process that will decrease patient wait times may provide an impetus for the 121<sup>st</sup>CSH to adopt a single phone appointing process.

#### Data Collection and Analysis

A centralized appointing system at the 121<sup>st</sup>CSH was established on March 8, 2006. Prior to this time, all appointments were handled by the clinics. Since only Primary Care, Internal Medicine, Dermatology, and Neurology use a centralized appointing system, historical staffing for central appointments was established to be three clerks. However, during the period reviewed for this study, the number of clerks employed ranged from one to three. Data was entered into Microsoft Excel and the Statistical Package for Social Sciences 16.0 (SPSS). Over the 104 weeks of the study, there was one clerk working in central appointments for eight weeks, two clerks for 70 weeks, and 3 clerks for 26 weeks. The average wait time for patients with one clerk on duty was 80 seconds, with two clerks on duty it was 77 seconds, and with three clerks it was 53 seconds. Summary data for central appointments is presented in Appendix D. Descriptive statistics are shown in Figure 1.

Clerks	Mean	N	Std. Deviation	Std. Error of Mean	Kurtosis	Std. Error of Kurtosis	Skewness	Std. Error of Skewness
1	79.88	8	40.527	14.328	2.801	1.481	1.779	.752
2	77.47	70	33.774	4.037	1.896	.566	1.312	.287
3	52.81	26	26.173	5.133	1.693	.887	1.317	.456
Total	71.49	104	34.057	3.340	1.834	.469	1.289	.237

*Figure 1. Descriptive statistics of wait times for centralized appointments*

The Clinical Support Division has established a wait time of less than 60 seconds as acceptable. Based on the acceptable wait time and the means of the wait times based on the number of clerks, three clerks are needed. Figure 2 shows that the difference in wait times for the centralized

appointing process is statistically significant when a comparison is made based on the number of clerks with a p-value of 0.004.

	Sum of Squares	df	Mean Square	F	Sig.
Average Wait Time Between Groups (Combined) and Clerks	12141.634	2	6070.817	5.713	.004
Linearity	9895.464	1	9895.464	9.312	.003
Deviation from Linearity	2246.170	1	2246.170	2.114	.149
Within Groups	107328.356	101	1062.657		
Total	119469.990	103			

Figure 2. ANOVA table for average wait times based on the number of clerks

Therefore we can say that wait time is affected by the number of clerks in a centralized appointing system. For the specialty clinics, only one year of data was available. Data for the specialty clinics was also pulled from CCMIS. Similar to the data for central appointments, data was entered into Microsoft Excel and SPSS. Summary data for the specialty clinics is presented in Appendices E-I. Figure 3 presents the descriptive statistics for the specialty clinics that are tracked by the CCMIS system.

Clinic	Mean	N	Std. Deviation	Std. Error of Mean	Kurtosis	Std. Error of Kurtosis	Skewness	Std. Error of Skewness
DOS	13.22	51	9.014	1.262	30.101	.656	4.985	.333
EENT	25.75	51	25.681	3.596	32.841	.656	5.258	.333
Mentalhealth	14.45	51	3.700	.518	-.051	.656	.357	.333
OBGYN	7.18	51	7.448	1.043	2.706	.656	1.206	.333
Orthopedics	37.80	51	15.925	2.230	.748	.656	1.037	.333
Total	19.68	255	18.110	1.134	29.657	.304	3.989	.153

Figure 3. Descriptive statistics of wait times for specialty appointments

Since the specialty clinics do not directly assign one person to handle phone calls, calls are taken by the front desk staff. To compare the different clinics, an assumption was made that the time spent by the front desk staff was equivalent to one full-time equivalent (FTE) for each specialty clinic. In September 2007, the OB-GYN clinic switched locations and was unable to utilize the CCMIS system. For this reason, the OB-GYN clinic will be excluded from further analyses. Average wait time for the Department of Surgery (DOS) was 13 seconds, for Eyes-Ears-Nose-Throat (EENT) clinic was 26 seconds, for mental health was 14 seconds, and for orthopedics was 38 seconds. Figure 4 presents the ANOVA to compare differences in wait times between the clinics.

		Sum of Squares	df	Mean Square	F	Sig.
Avg.Answer.Delay * Clinic	Between Groups	20163.176	3	6721.059	26.669	.000
	Linearity	12459.751	1	12459.751	49.441	.000
	Deviation from Linearity	7703.425	2	3851.713	15.284	.000
	Within Groups	50402.980	200	252.015		
	Total	70566.157	203			

*Figure 4. ANOVA table for average wait times in the specialty clinics*

Based on the statistical analysis, there is a difference in wait times between the clinics. Since the FTEs utilized by the specialty clinics are the same, there must be another factor which leads to the differences in wait time among the specialty clinics. Based on this line of reasoning, a decision was made to run an additional ANOVA with clinics and the number of phone calls received and how they affect the wait time. Figure 5 shows the results of the ANOVA and that when the number of phone calls received is factored into the analysis of wait times, there is no difference between the specialty clinics.

		Sum of Squares	df	Mean Square	F	Sig.
Avg.Answer.Delay	Between (Combined)	47896.157	161	297.492	.551	.995
* Num.Received	Groups					
	Linearity	21140.871	1	21140.871	39.167	.000
	Deviation from Linearity	26755.286	160	167.221	.310	1.000
	Within Groups	22670.000	42	539.762		
	Total	70566.157	203			

*Figure 5. ANOVA table for specialty clinic wait times based on number of phone calls received*

This allows for the consideration of the specialty clinics as one large clinic and compares those clinics utilizing the central appointment process against those clinics not utilizing the central appointment process. It is important to remember that the OB-GYN clinic has been excluded from the analysis. The next step in the process was to determine whether a centralized appointment process had the lowest wait time. Therefore an ANOVA was conducted to compare the effect of the number of phone calls received on the wait times. Figure 6 shows that there is no significant statistical difference between a centralized appointment system and a clinic specific appointing system when the number of phone calls received is considered.

		Sum of Squares	df	Mean Square	F	Sig.
Avg.Answer.Delay*	Between (Combined)	310971.737	256	1214.733	1.463	.052
Num.Received	Groups					
	Linearity	183352.471	1	183352.471	220.839	.000
	Deviation from Linearity	127619.266	255	500.468	.603	.994
	Within Groups	42343.000	51	830.255		
	Total	353314.737	307			

*Figure 6. ANOVA table for wait times between appointment scheduling processes*



Knowing that the type of appointing process does not affect the wait times if the number of calls received is similar, we can now compare the wait times by conducting a linear regression and comparing wait times when the number of calls received is constant. Figures seven and eight show the coefficients of a linear regression analysis for the wait times and number of phone calls received for clinics that are utilizing the central appointments process and clinics that are not. The regression analysis is presented in Appendix J.

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	42.075	17.462		2.410	.018
Num.Received	.034	.020	.167	1.716	.089

a. Dependent Variable: Avg.Answer.Delay

Figure 7. Coefficients for clinics using the centralized appointing process

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	6.737	2.046		3.292	.001
Num.Received	.077	.008	.547	9.295	.000

a. Dependent Variable: Avg.Answer.Delay

Figure 8. Coefficients for clinics not using the centralized appointing process

Utilizing the information gained from the regression analysis, equations can be established for both appointment scheduling processes. The equation for both processes should be

$$\text{Wait time} = b_0 + b_1x_1$$

Where  $b_0$  = the unstandardized constant

$$x_1 = \text{Num.Received}$$

$b_1$  = coefficient for Num. Received

Therefore the equation for clinics using the centralized appointing process is

$$y = 42.075 + .034x$$

and the equation for clinics not using the centralized appointing process is

$$y = 6.737 + .077x$$

Taking these equations and plotting them, we can see the possible wait times depending on the number of phone calls received. At a value of 822 phone calls received, the wait time for the centralized appointing process becomes less than the wait time for a clinic not using the centralized appointing process (Figure 9).

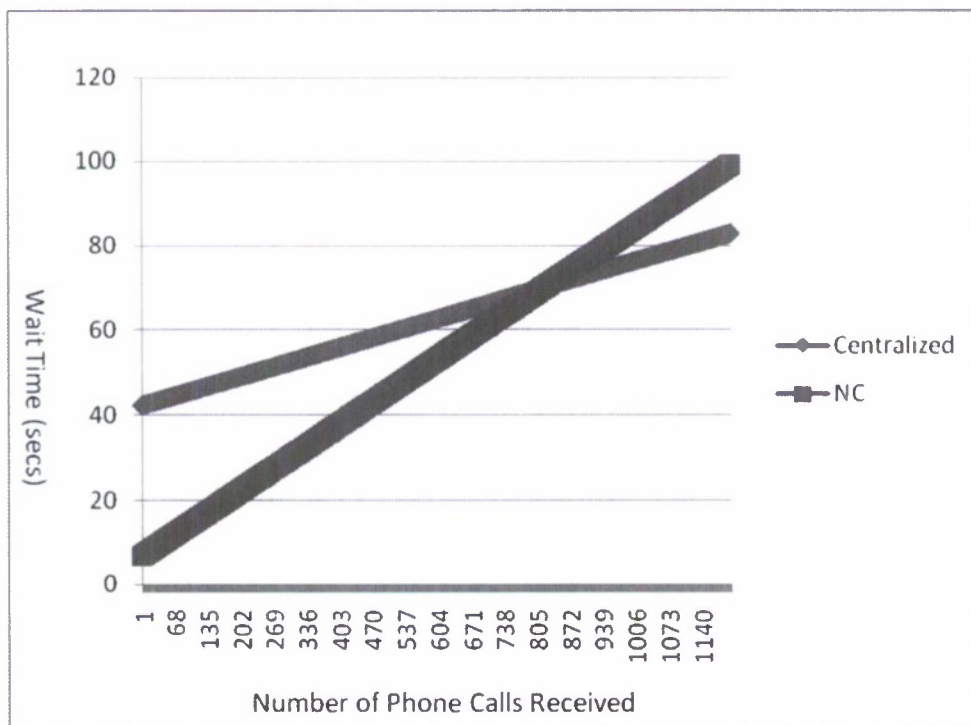


Figure 9. Expected wait times for appointing processes

Therefore if the 121<sup>st</sup> CSH expects to receive more than 822 phone calls requesting appointments on a weekly basis, it would be beneficial to utilize a centralized appointing process.

## Findings and Utility of Results

A centralized appointing system will be the most effective in quickly assigning patients to open appointment slots. During the time period examined in this study, the average number of phone calls received by the clinics using a centralized appointing process was 856 while the clinics that were not utilizing the central appointment process averaged just over 840 phone calls per week. The 121<sup>st</sup>CSH was able to reduce the FTE requirements from four to three when Primary Care, Internal Medicine, Dermatology, and Neurology converted to a centralized appointing process. While this study did not examine the FTE requirements, similar reductions in FTE requirements should be expected when the other clinics also convert to a centralized appointing process. The statistical analysis showed that there was no difference in wait times for scheduling appointments when the number of clerks in the different appointing processes were equalized. This left two variables to compare: number of phone calls received and the appointing process. When the number of phone calls received was equalized among the specialty clinics, the analysis showed that there was no difference among the wait times for scheduling appointments. Based on this analysis, the specialty clinics were all combined to establish an overall sample which could be compared to those clinics utilizing a central appointing process. When a statistical analysis was done between the two appointing processes, there was no statistical difference between the wait times. Since there is no affect from the type of appointing process and the number of clerks utilized, the difference in wait times must be a result of the volume of phone calls received. Conducting a regression analysis provided clarity on the effect of the number of phone calls received on the wait times. As the volume of phone calls increased, the regression analysis showed that the centralized appointing process would be more efficient.

### Limitations of the Study

Some limitations to this study include clinic specific requirements, the effect of the type of appointing process on patient satisfaction, lack of an analysis of patients that hung up before reaching an appointment clerk, and the results of the encounter with the appointment clerk. Because the process of appointing patients is slightly different for each specialty clinic, it is possible that there may be some unique issues that were not accounted for in this study. While overall patient satisfaction with the 121<sup>st</sup>CSH appointing processes was reviewed, this study did not conduct an analysis of patient satisfaction at the clinic level. While wait times for scheduling appointments will have an effect on patient satisfaction there may also be other variables involved. An extremely competent and efficient appointment or desk clerk may enhance patient satisfaction for a specific clinic or perhaps there are more providers in a clinic so that capacity is greater than demand. In addition, although the study examined the wait times for patients wanting to schedule an appointment, patients that hung up before speaking with an appointment clerk were not analyzed. Finally, it is possible that some patients that spoke with an appointment clerk did not get an appointment.

### Recommendations

While there are some clinic specific requirements that make the process in the specialty clinics different, adjustments can be made by a centralized appointment center by providing training to the staff. Since the staff will be working and training together, they will be able to gain an organizational understanding of the specific requirements for each specialty clinic. In addition, some training will be required for clinic providers. In some specialty clinics, providers make notes on the referral, print the referral and then give the printed referral to the appointment clerk. In a case like this, the provider can be trained to send the print request to a printer located



in the call center or the clerks in the call center can be tasked to print referrals from the clinic. In either case, the provider will save time and effort that can be focused on patient care. Wherever staffing is not adequate to handle the volume of work, shortcuts are taken by the staff to ensure that the critical requirements are completed while those that are not as critical may be delayed until staffing increases or the requirement changes. Reconciling patient referrals with patients that receive appointments, DEERS eligibility checks, and ensuring physician schedules are available six weeks from the current date are only some tasks that may be delayed if staffing is not adequate. By decreasing the FTE requirement and increasing coverage through standardized training, a centralized appointment system may be able to ensure completion of all tasks that will increase access and patient satisfaction for our beneficiaries. However, it will still be critical for healthcare administrators to ensure that staffing remains at an acceptable level. As stated earlier, appropriate access to care results in greater patient satisfaction and better outcomes. If patients hang up because they perceive that the wait time is too long for scheduling an appointment, this will lead to decreased patient satisfaction and worse outcomes for 121<sup>st</sup>CSH patients.

This study examined the effect of the staffing, the number of phone calls received, and the type of appointing process on patient wait times for scheduling appointments. To provide further clarification of the appointing process at the 121<sup>st</sup>CSH, further studies should be conducted that directly evaluate patient satisfaction with the current appointing processes. In addition, further studies should make sure to include the OB-Gyn clinic in the analysis. Finally, after implementation of a centralized appointment scheduling system for all the clinics at the 121<sup>st</sup>CSH, it will be useful to conduct a comparison of the new and current appointing process.

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## Appendix A

### TRICARE Categories

**Emergency** - a sudden or unexpected condition or the acute worsening of a chronic condition that is threatening to life, limb or sight and that requires immediate medical treatment to relieve suffering from painful symptoms.

**Urgent Care** - medical attention for a condition that, while not life or limb threatening, could become more serious if not treated. Examples of urgent care include eye or ear infections and suspected bladder infections. When traveling away from home, this type of care, unlike emergency care, requires the authorization of a primary care manager.

**Routine Care** - is medical care for symptoms-such as colds and flu or low-back pain, for which intervention is required, but is not urgent. The maximum waiting time for routine care is one week.

**Wellness Care** - is medical care to promote health maintenance and prevention, for example Pap tests. The maximum waiting time for well care is four weeks.

**Specialty Care** - is provided by a specialist in TRICARE's provider network after referral by a primary care manager. The maximum waiting time for specialty care is 28 days (Understanding TRICARE's Access Standards, 2007).

## Appendix B

### Patient Data Form

Personal Data - Privacy Act of 1974 (PL 93-579)

SF508

OUTPATIENT CLINIC VISIT

18TH MEDICAL COMMAND BHO

PC: FMP/ESN: AGE:36 DOB:06 Dec 1972 SEX:MALE

Allergies:

NKDA:

CURRENT 18TH MEDCOM MEDICATION PROFILE

AS OF: 25 Oct 2007

Are you still taking the following medication(s)? Please cross out the one you are no longer taking.

OTC-ACETAMINOPHEN--PO 325MG TAB QTY: 1 REFILL LEFT: 0 MCP: SELF-CARE

TAKE AS DIRECTED AS NEEDED--FOR PAIN OR FEVER -

OTC-IBUPROFEN--PO 200MG TAB QTY: 1 REFILL LEFT: 0 MCP: SELF-CARE

TAKE AS DIRECTED AS NEEDED--FOR PAIN OR FEVER -

Please LIST all your home medications: Over-the-counter (OTC), Vitamins, Herbal products/supplements and prescriptions from other providers or hospitals that you are taking regularly or occasionally at home.

If there are changes to your medication list, PLEASE let your doctor or pharmacist know to update your medication profile.

HDL: 54

LDL: 78

Trig: 350 ~~464~~

Lab information updated by the  
appointment clerk in the EENT clinic

## Appendix C

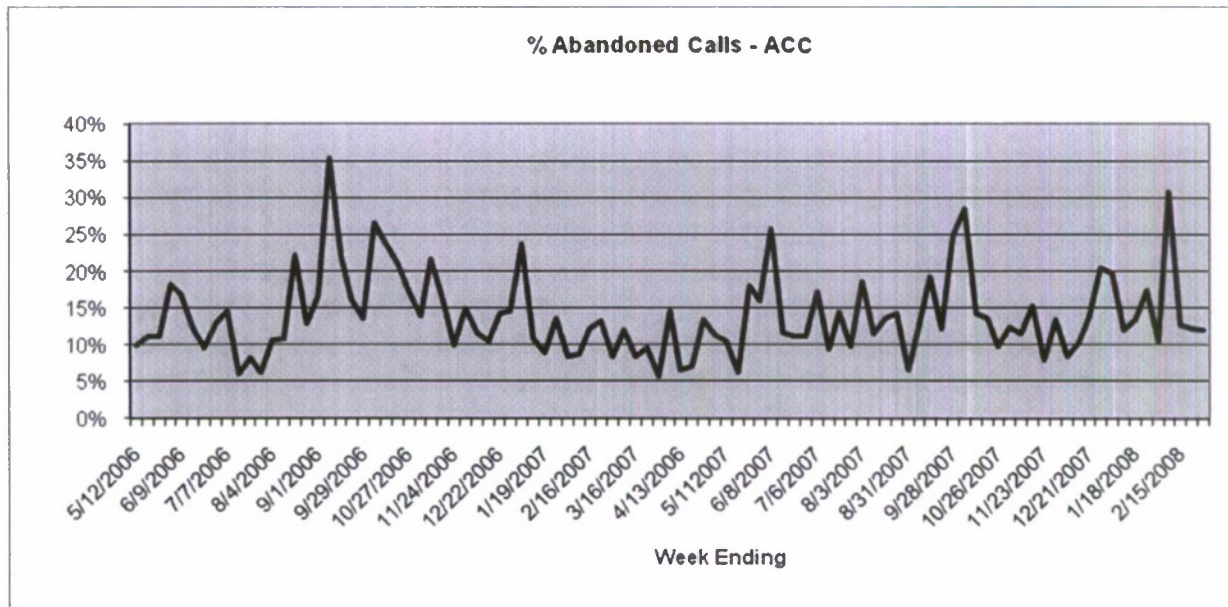
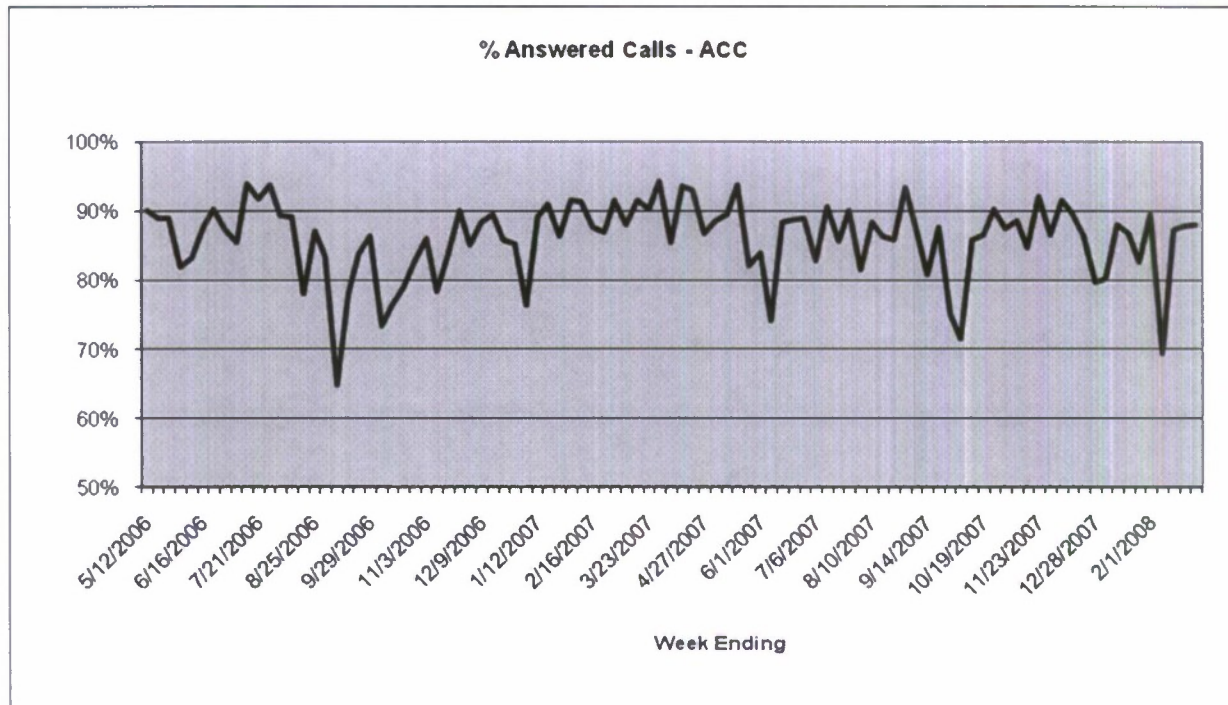
### Elements of Primary Care

1. Integrated and accessible health care services.
2. Services provided by primary care clinicians—generally considered to be physicians, nurse practitioners, and physician assistants—but involving a broader array of individuals in a primary care team.
3. Accountability of clinicians and systems for quality of care, patient satisfaction, efficient use of resources, and ethical behavior.
4. The majority of personal health care needs, which include physical, mental, emotional, and social concerns.
5. A sustained partnership between patients and clinicians.
6. Primary care in the context of family and community (Donaldson, Yordy, Lohr & Vanselow, 1996).



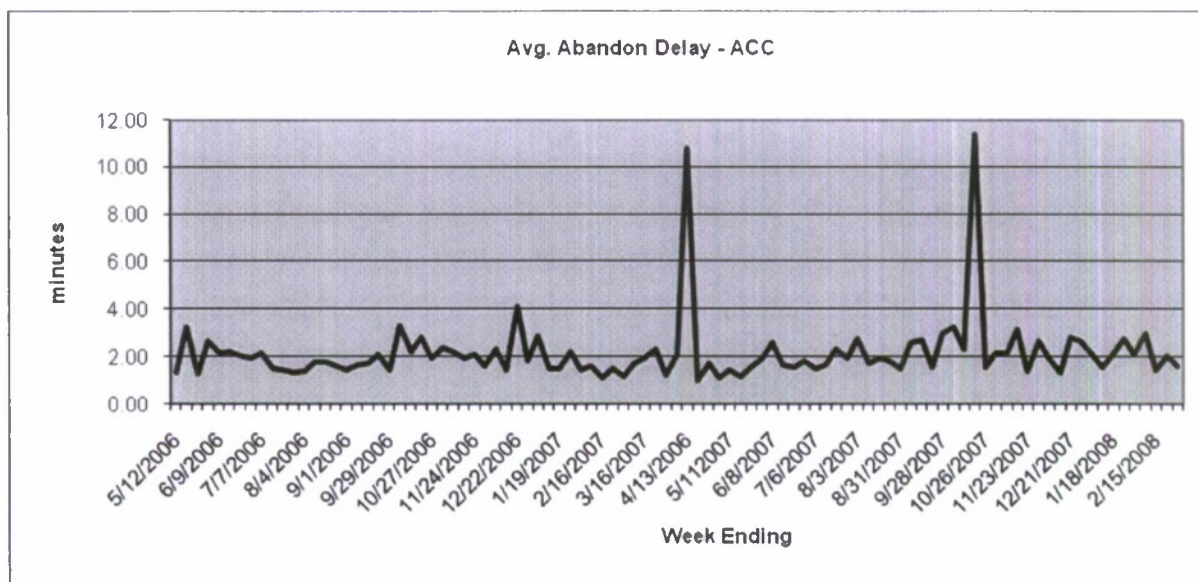
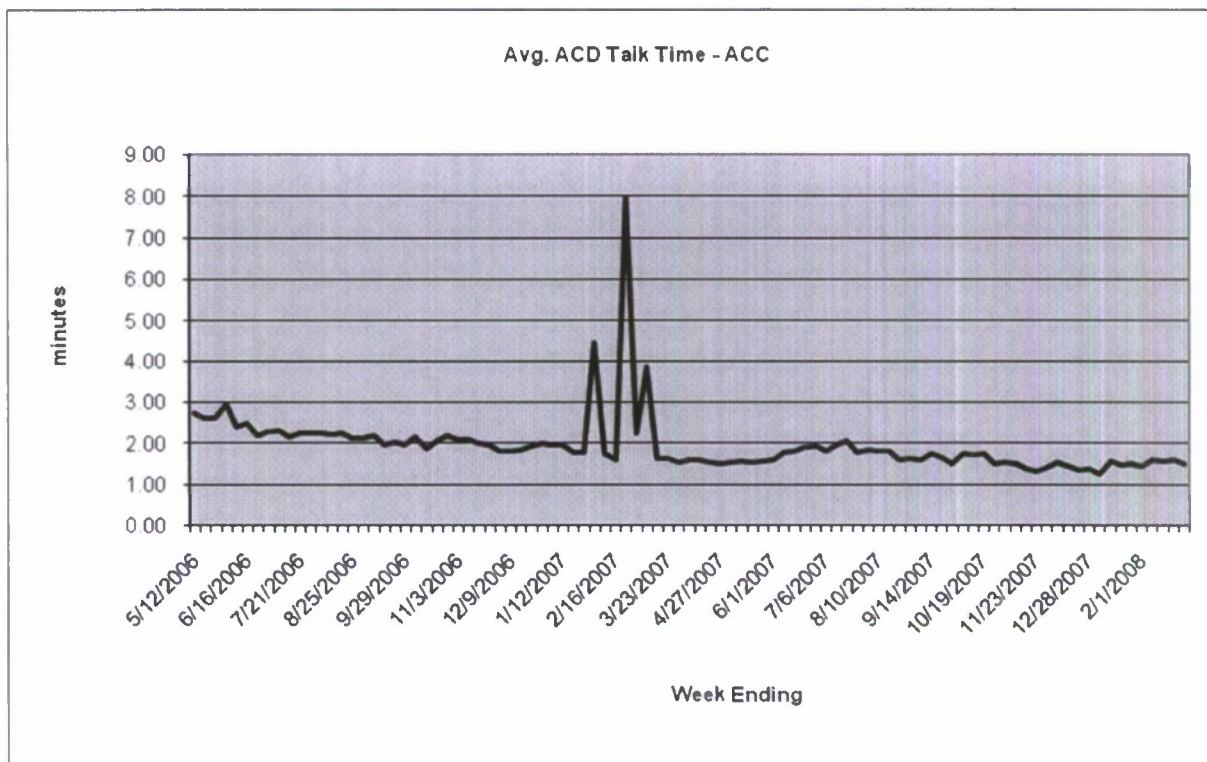
## Appendix D

### Phone System Summary for Central Appointments



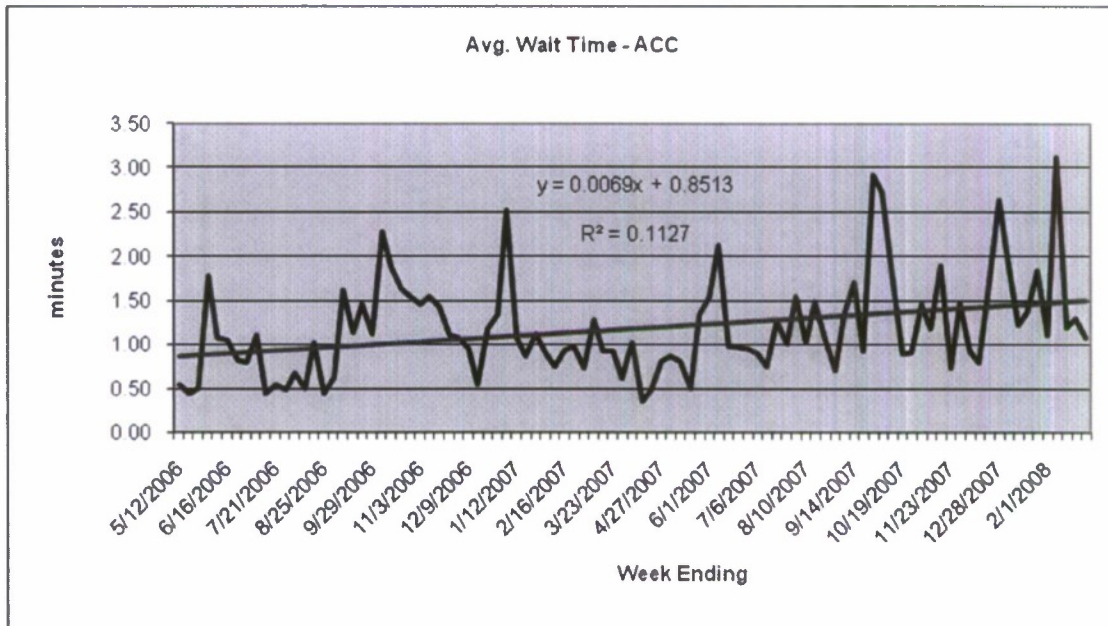
## Appendix D

### Phone System Summary for Central Appointments



## Appendix D

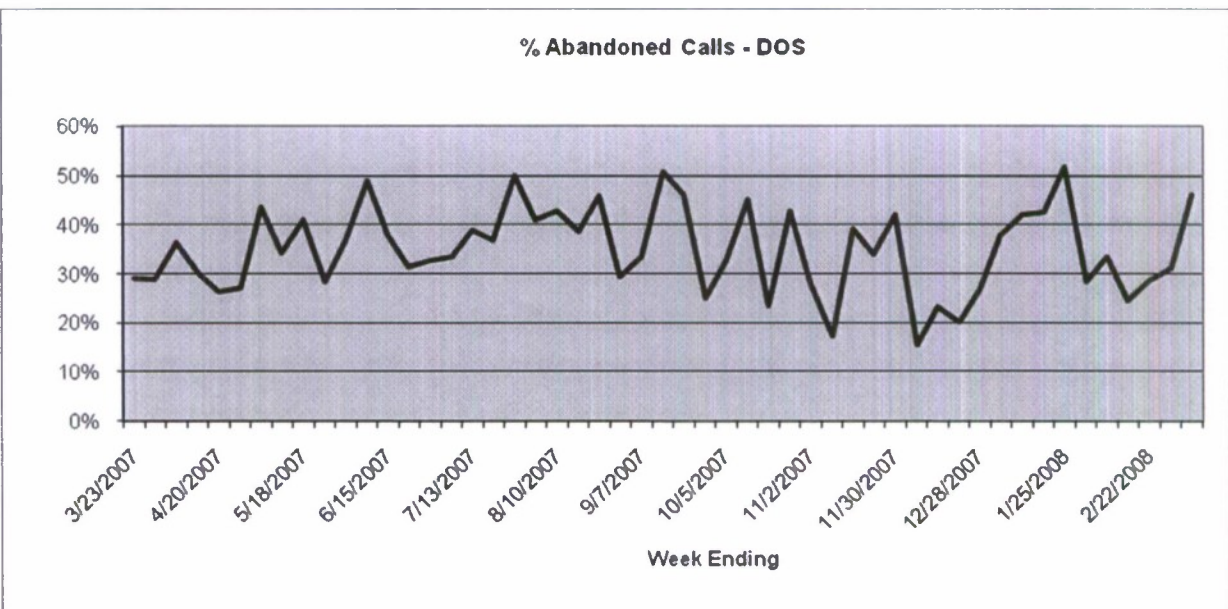
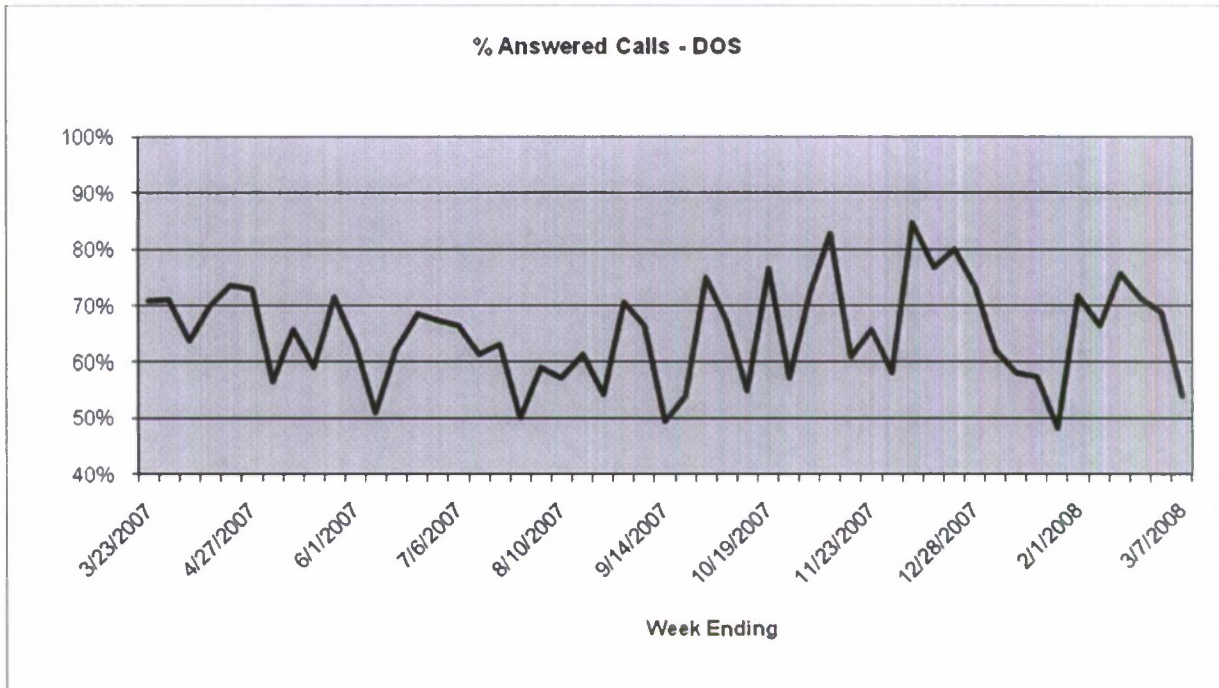
### Phone System Summary for Central Appointments





## Appendix E

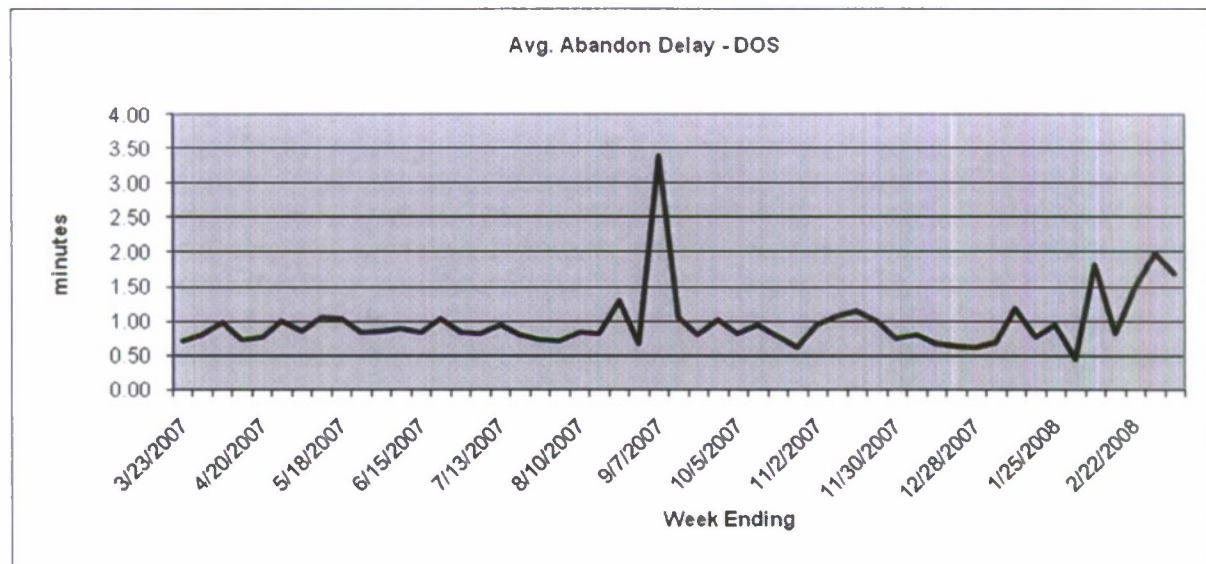
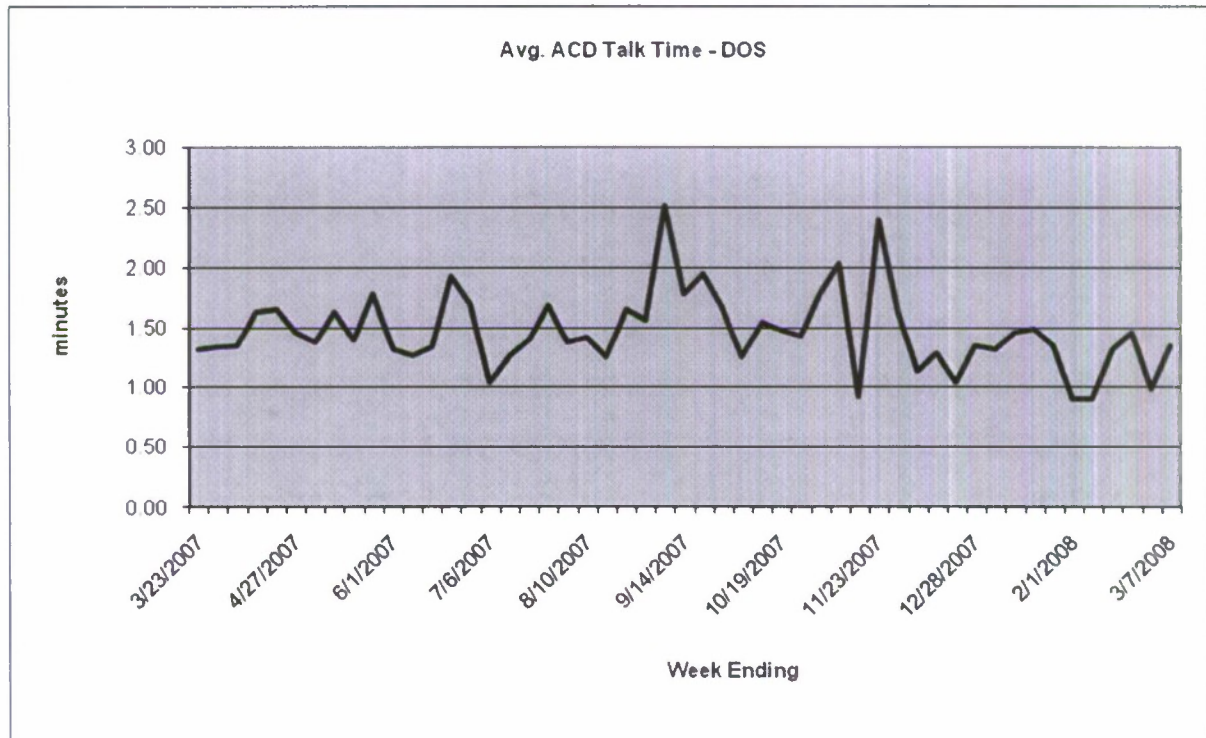
### Phone System Summary for Department of Surgery





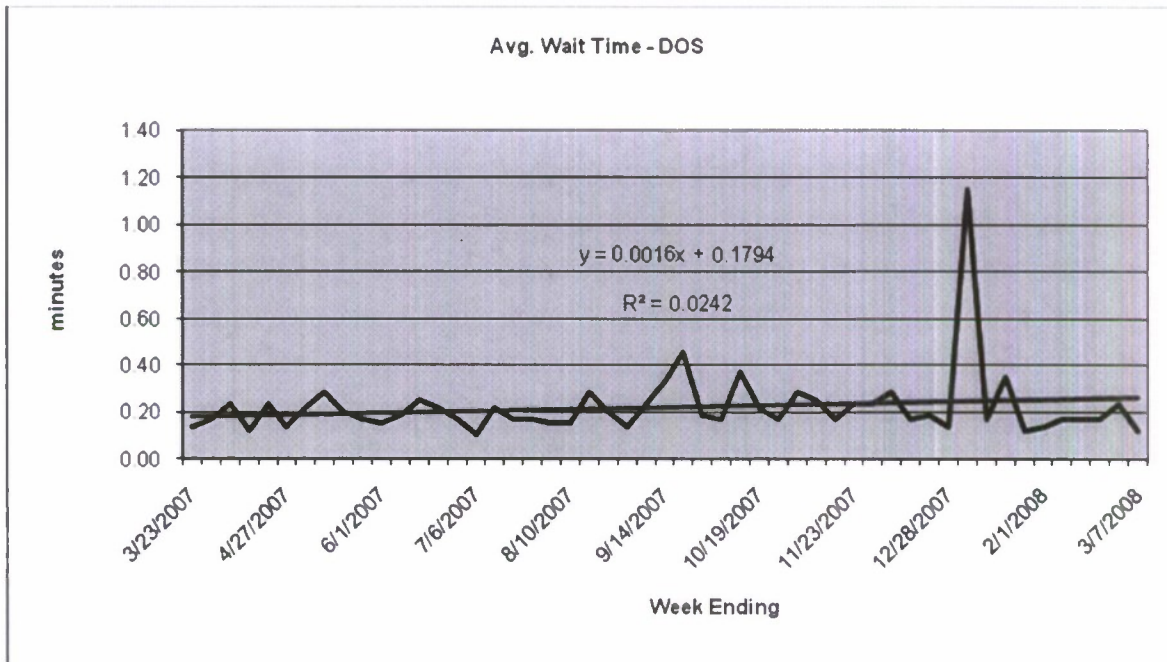
## Appendix E

### Phone System Summary for Department of Surgery



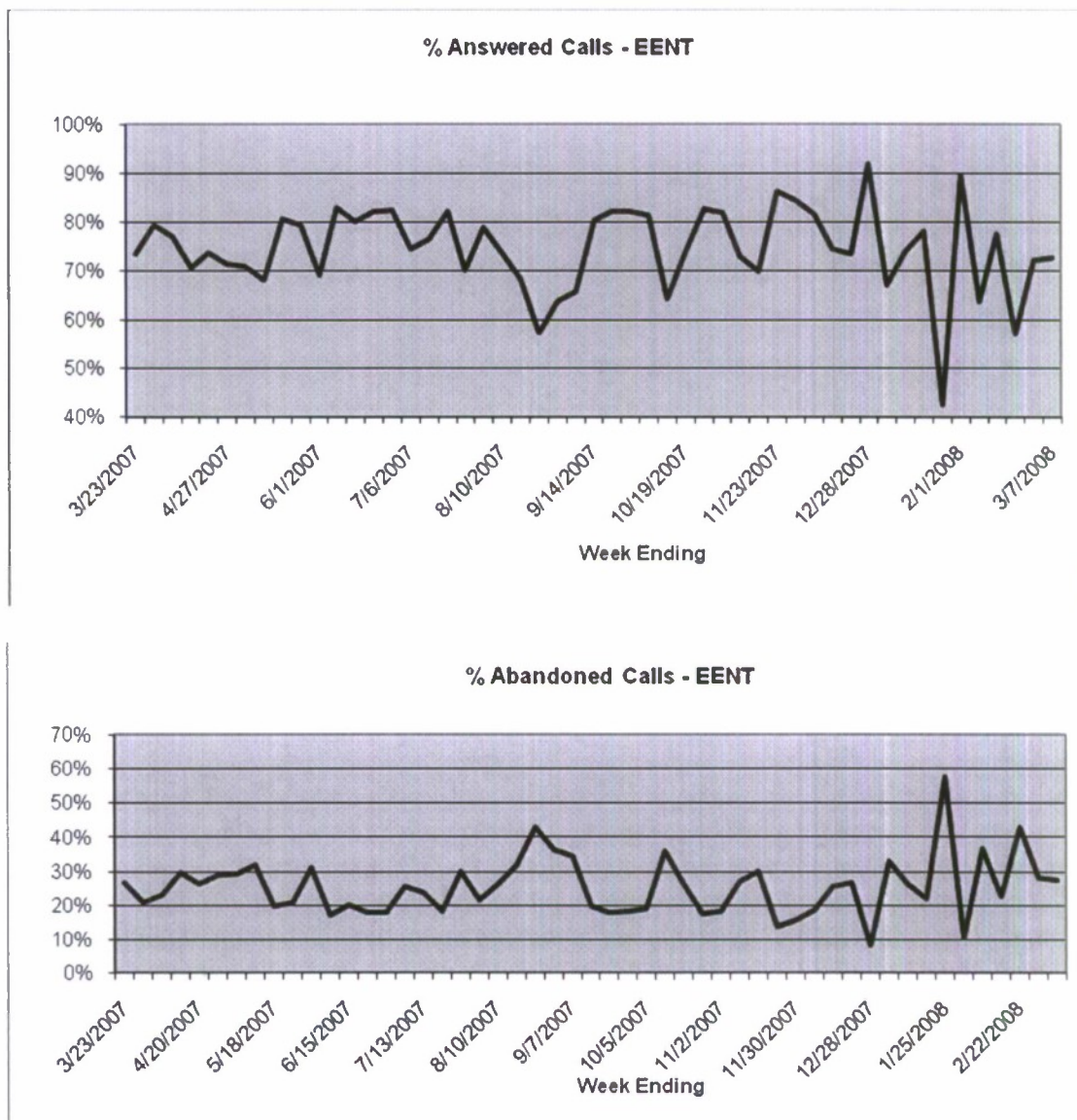
## Appendix E

### Phone System Summary for Department of Surgery



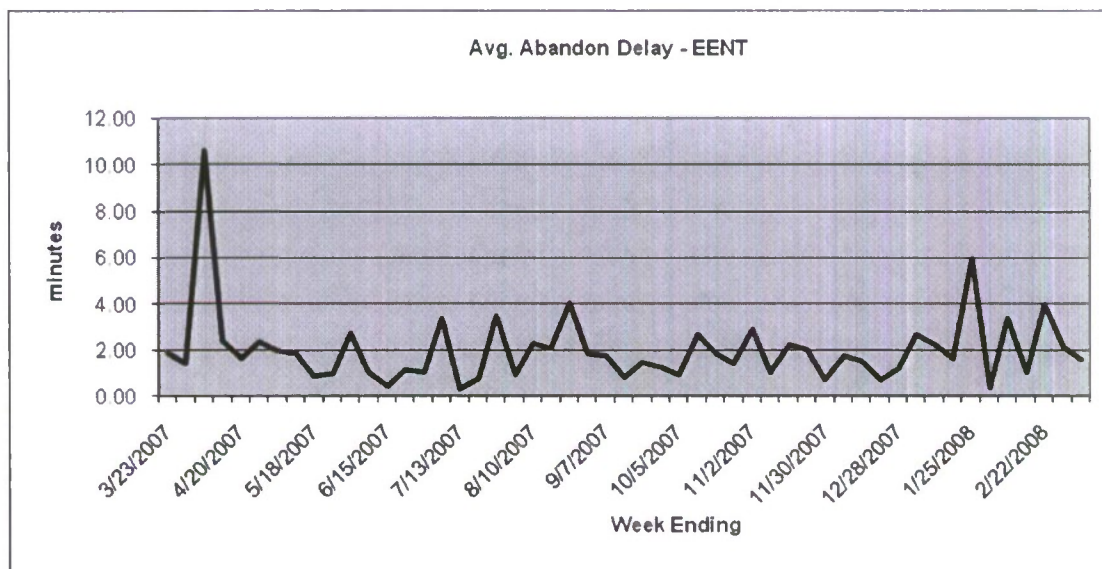
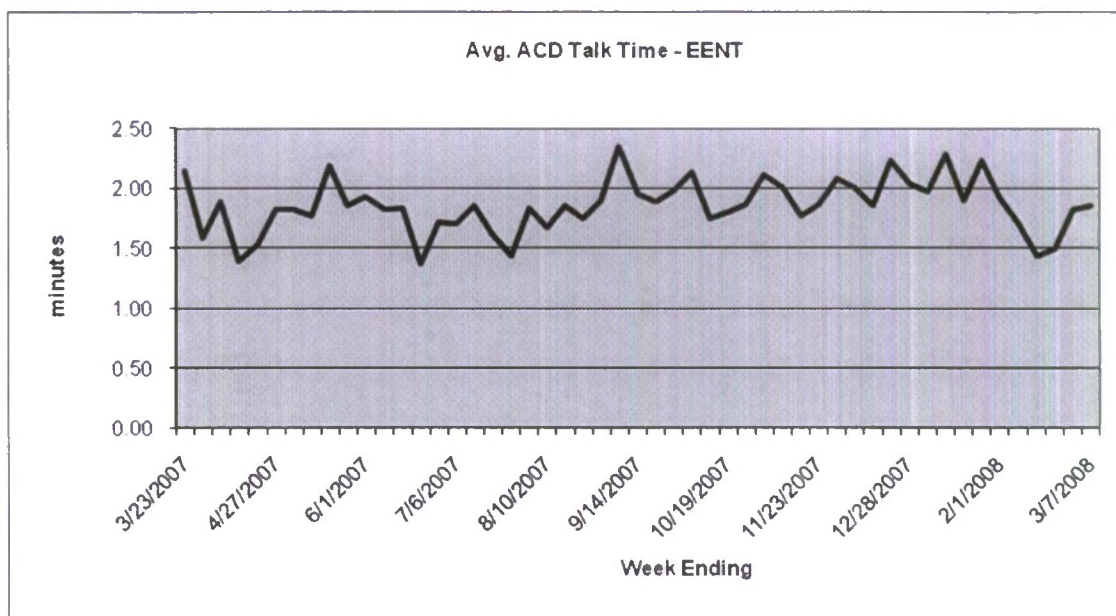
## Appendix F

### Phone System Summary for Eyes, Ears, Nose, and Throat Clinic



## Appendix F

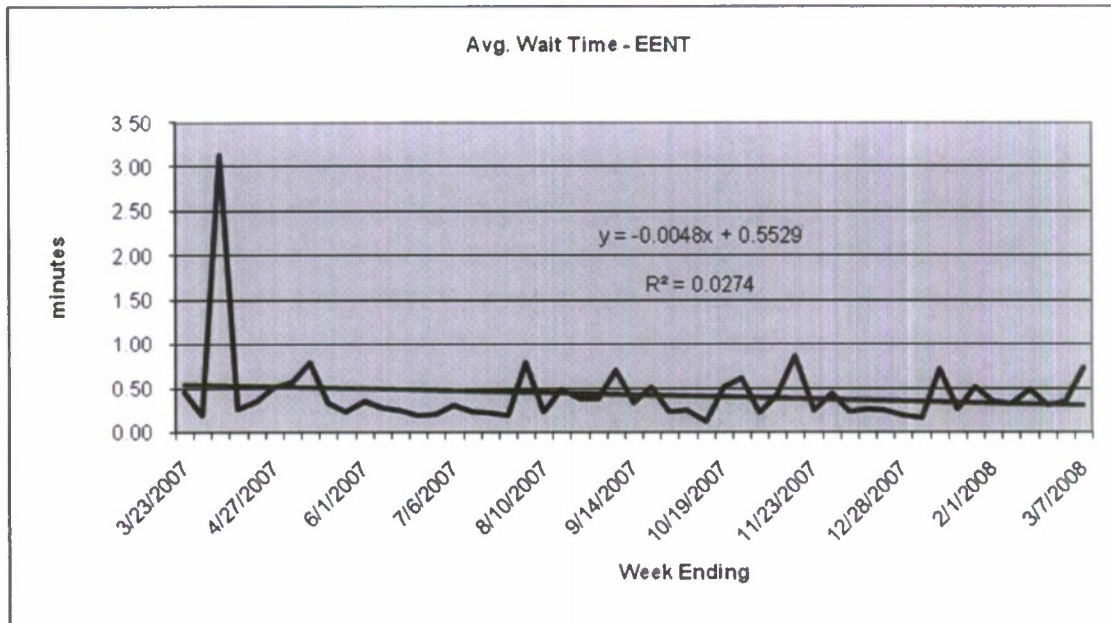
### Phone System Summary for Eyes, Ears, Nose, and Throat Clinic





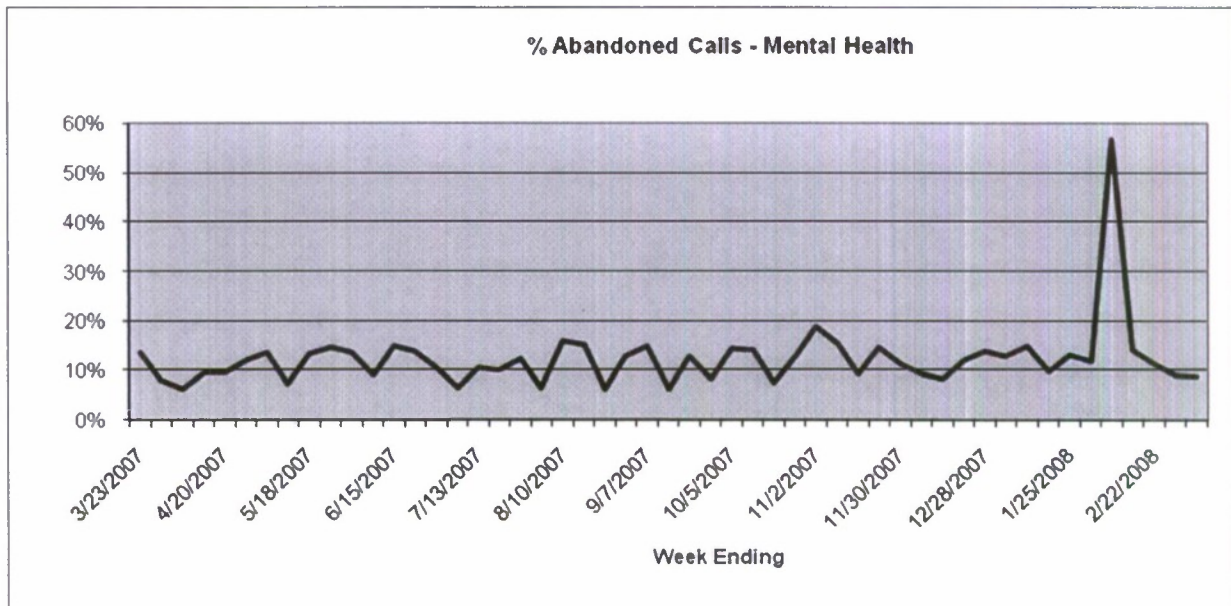
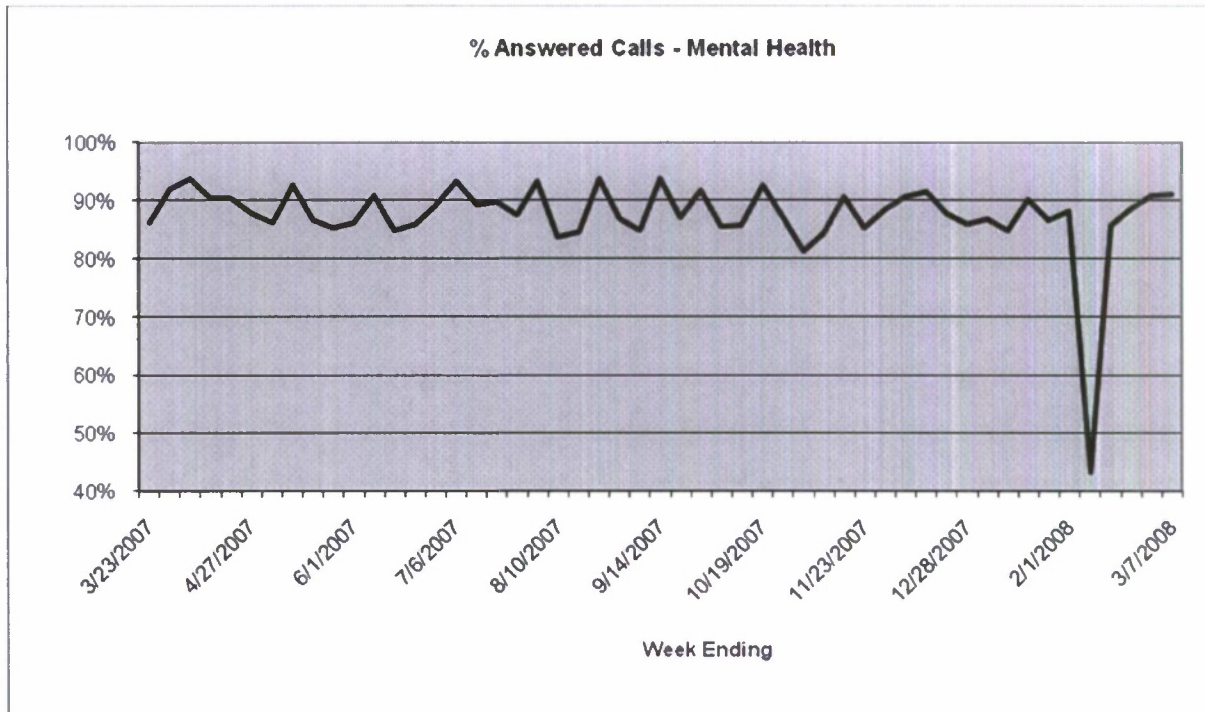
## Appendix F

### Phone System Summary for Eyes, Ears, Nose, and Throat Clinic



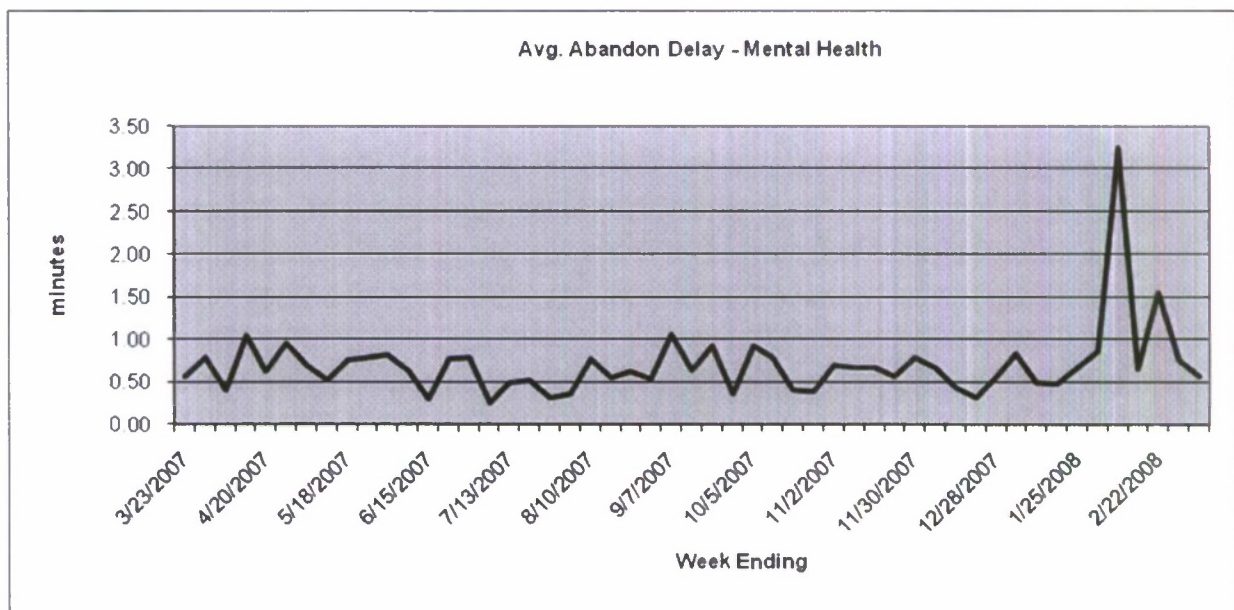
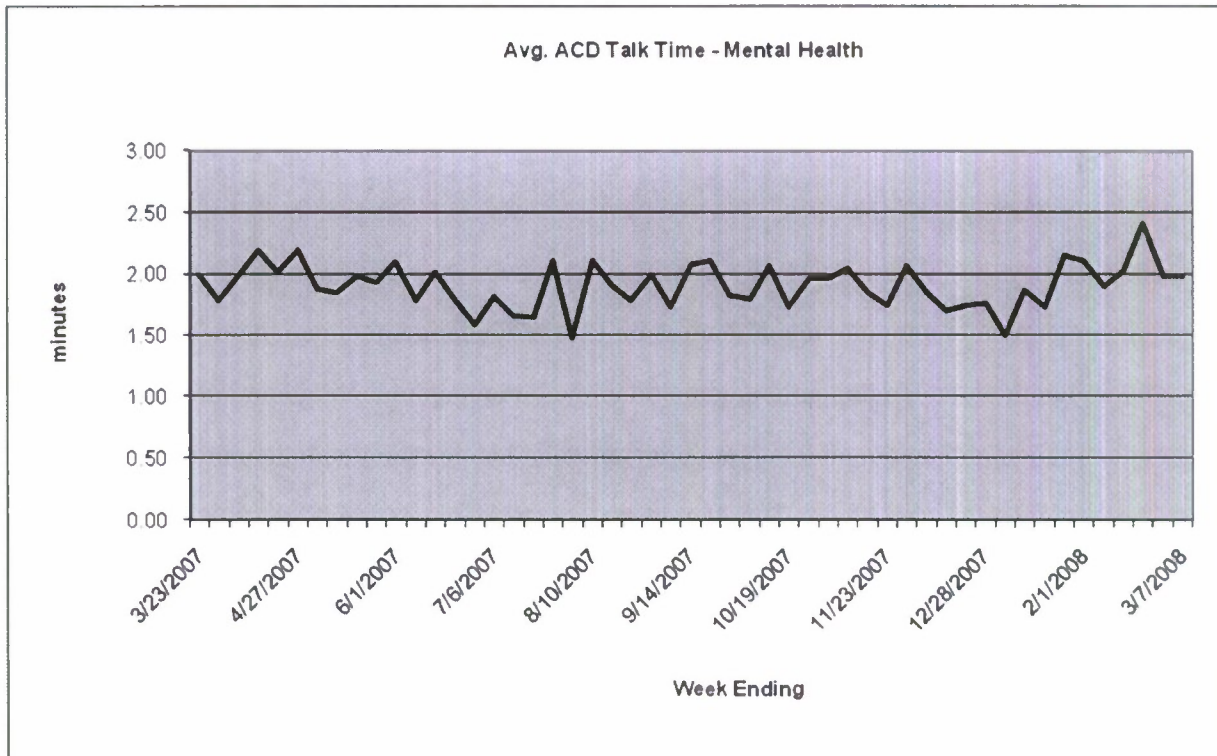
## Appendix G

### Phone System Summary for Mental Health Department

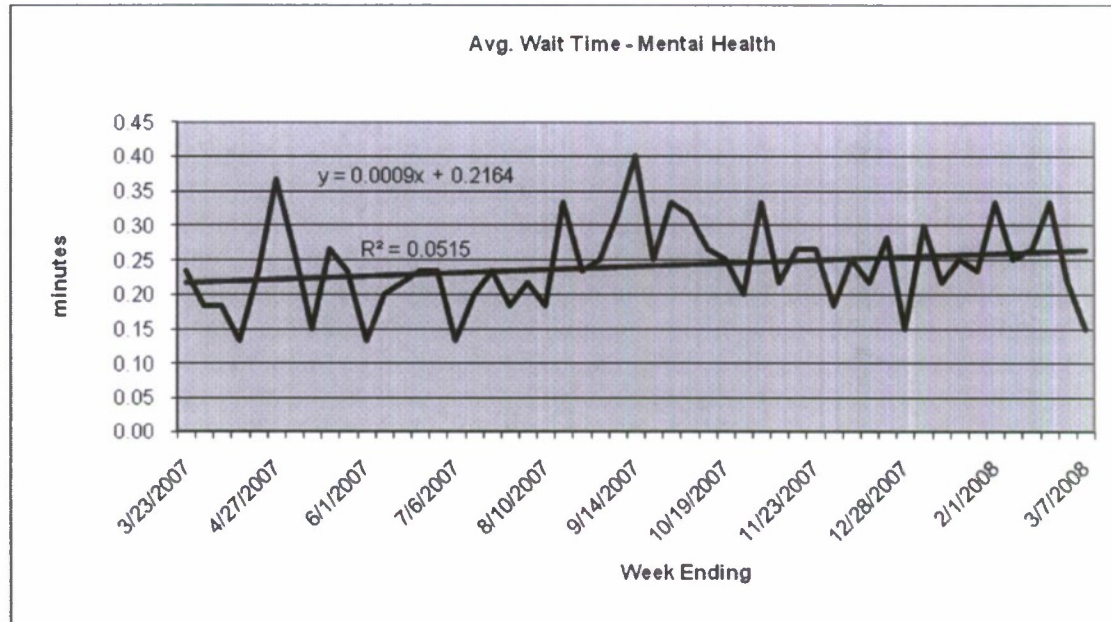


## Appendix G

### Phone System Summary for Mental Health Department

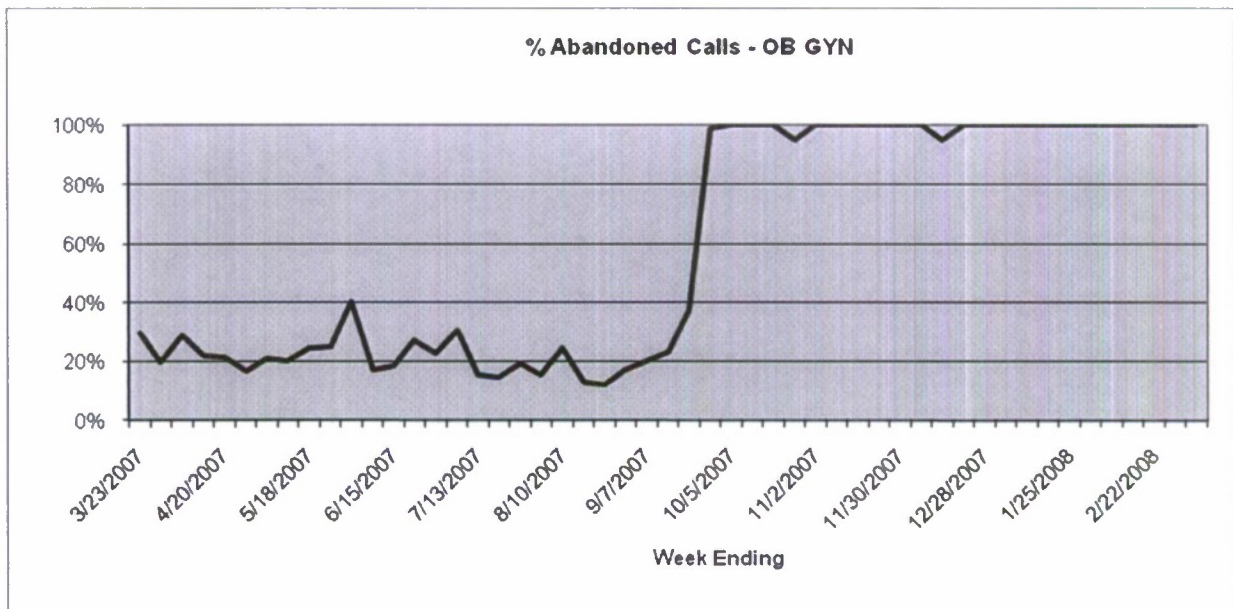
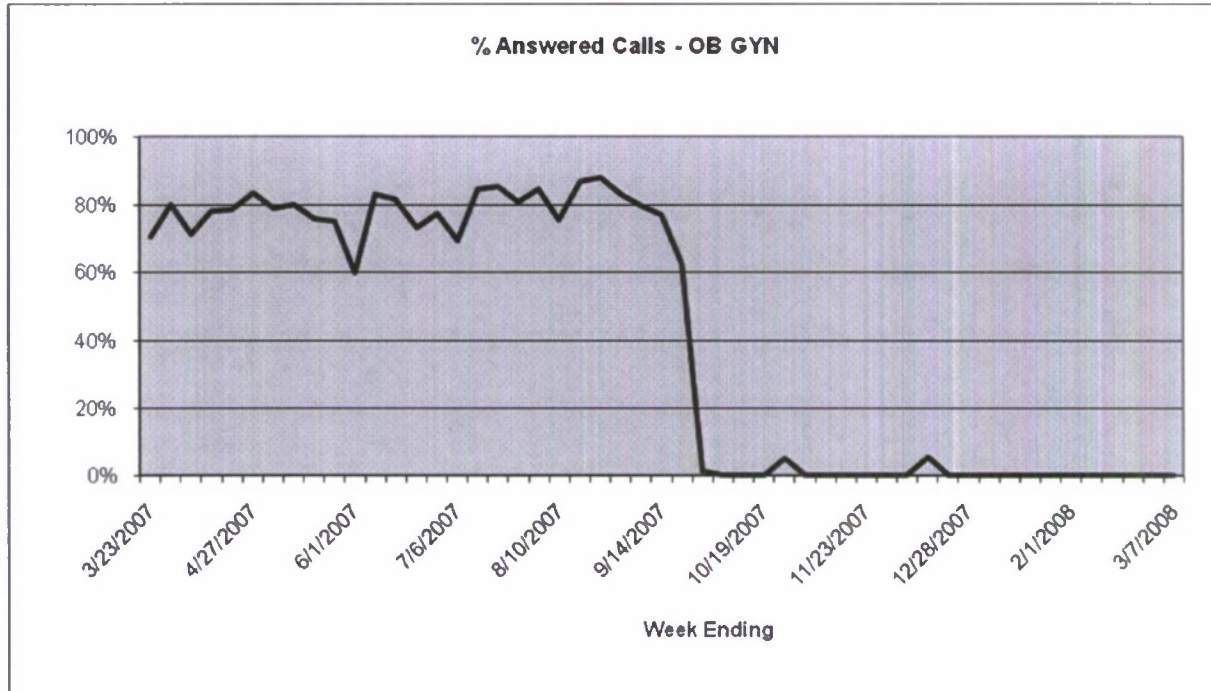


## Phone System Summary for Mental Health Department



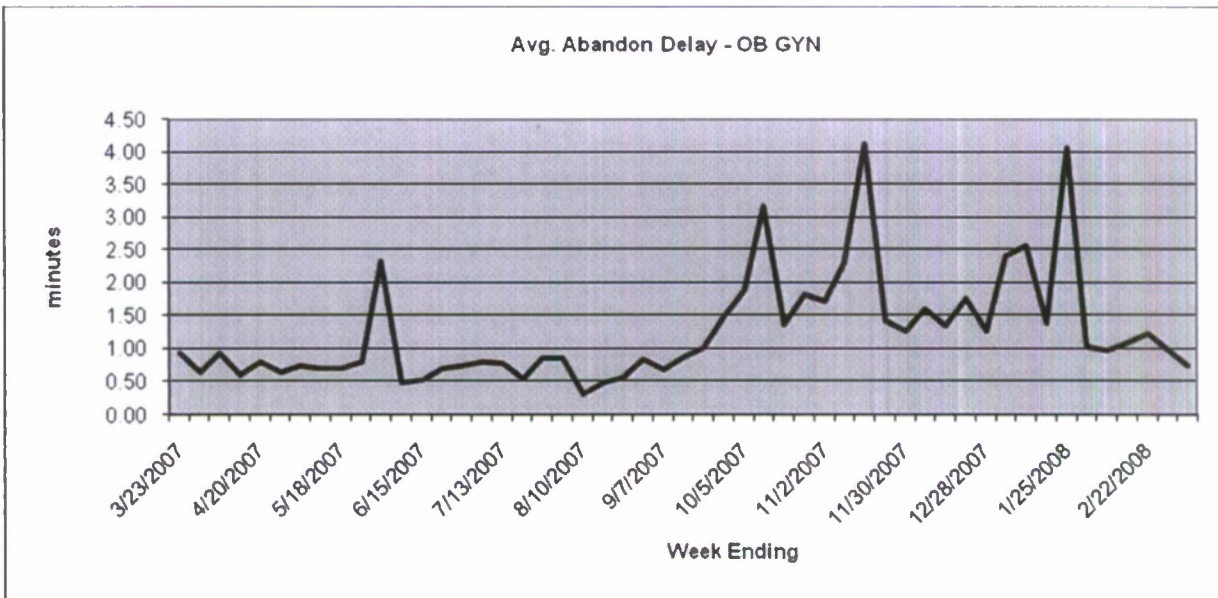
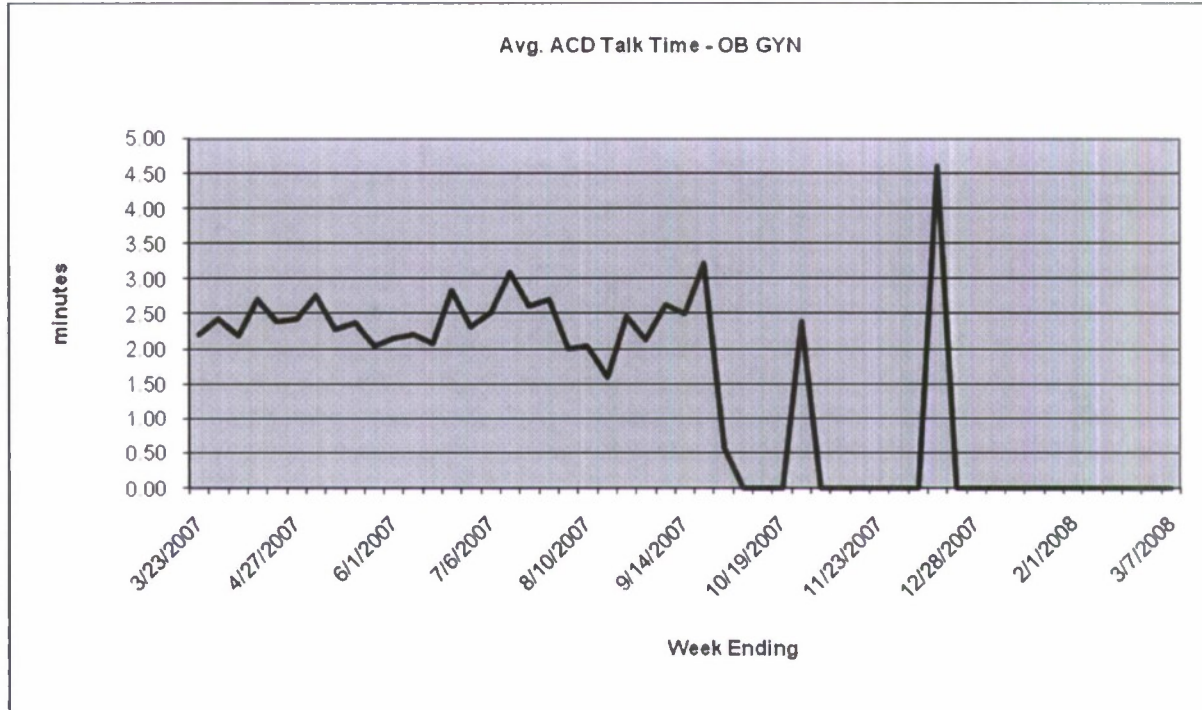


## Phone System Summary for OB-GYN Clinic



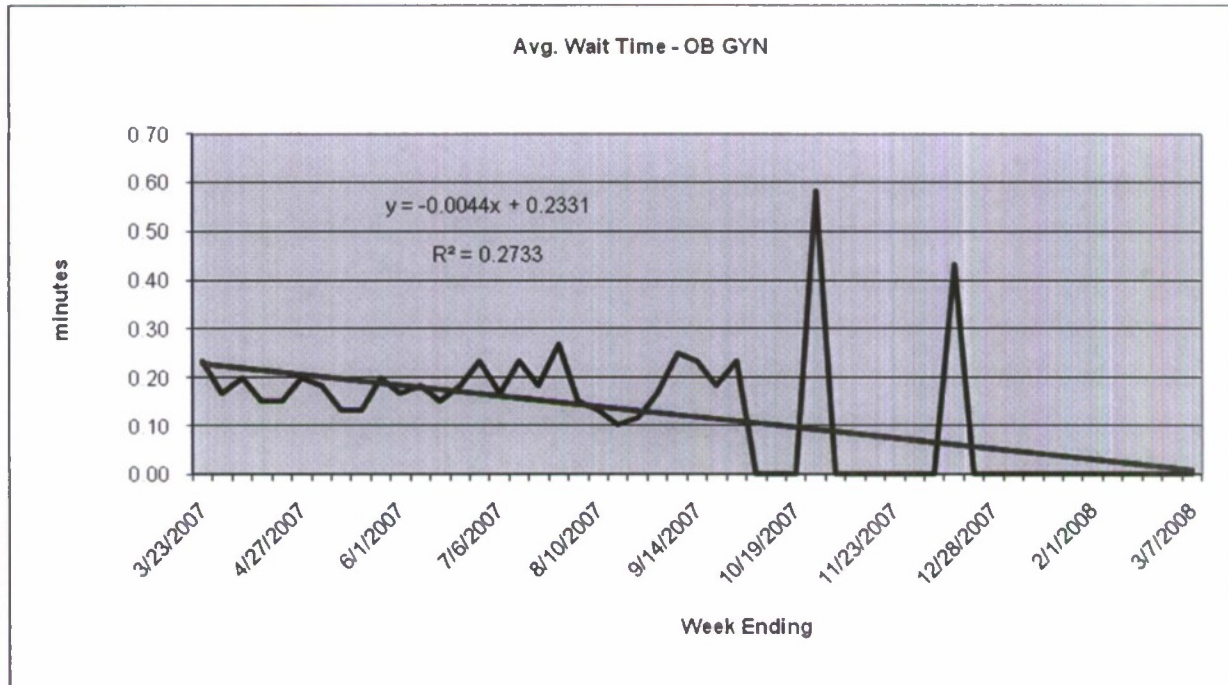
Appendix H

## Phone System Summary for OB-GYN Clinic



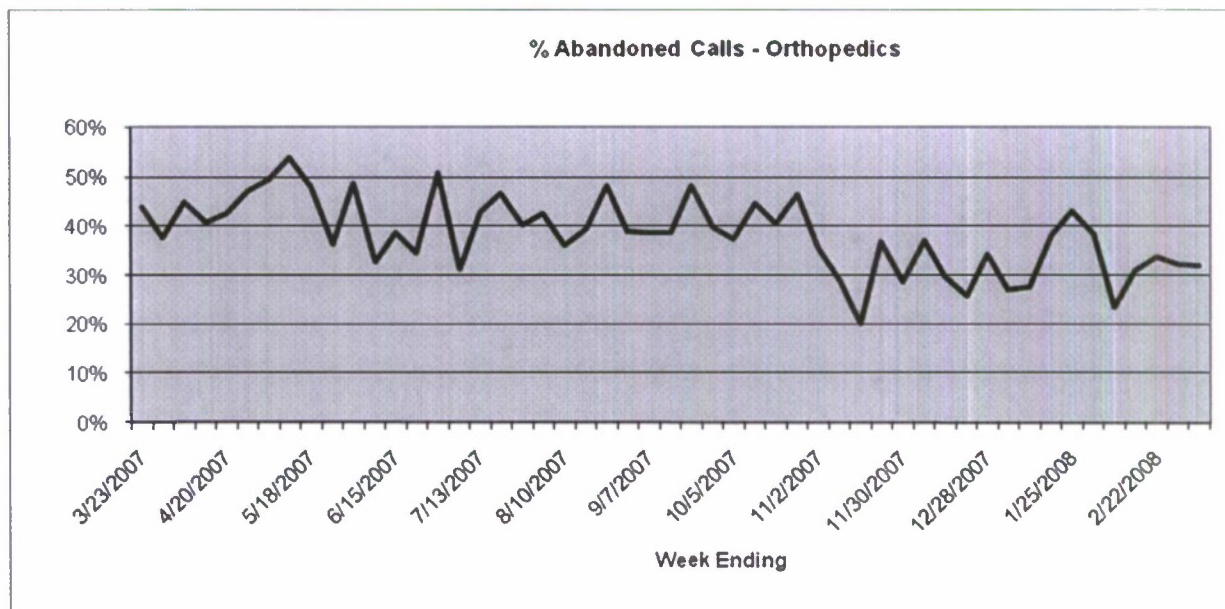
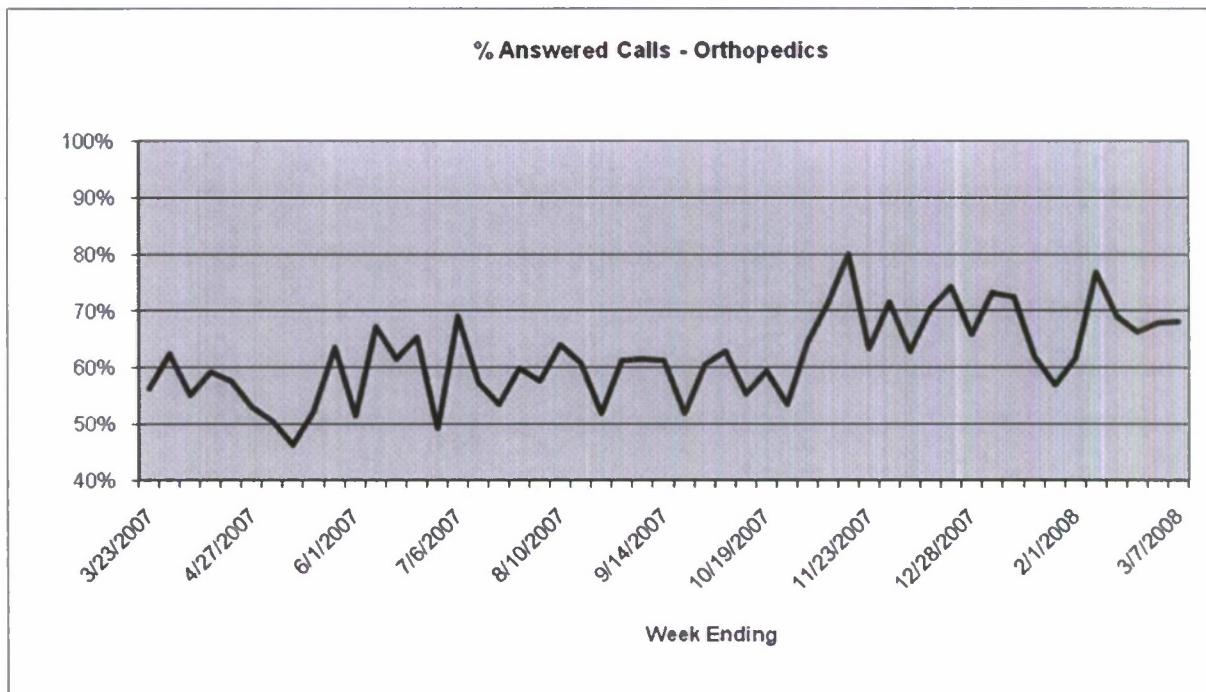
## Appendix H

## Phone System Summary for OB-GYN Clinic





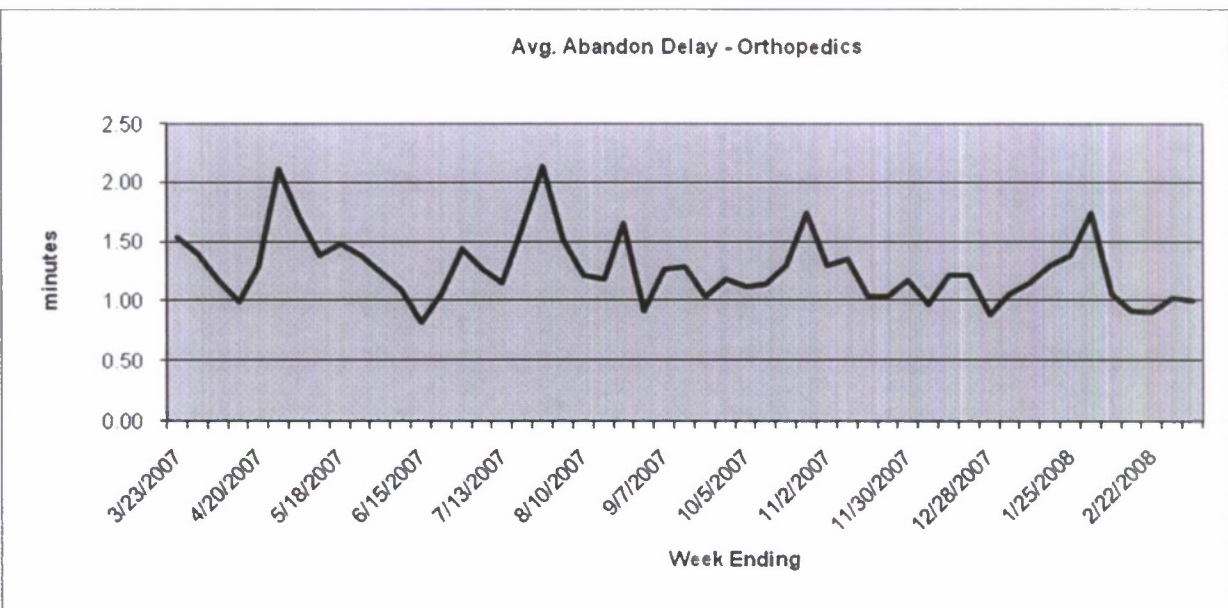
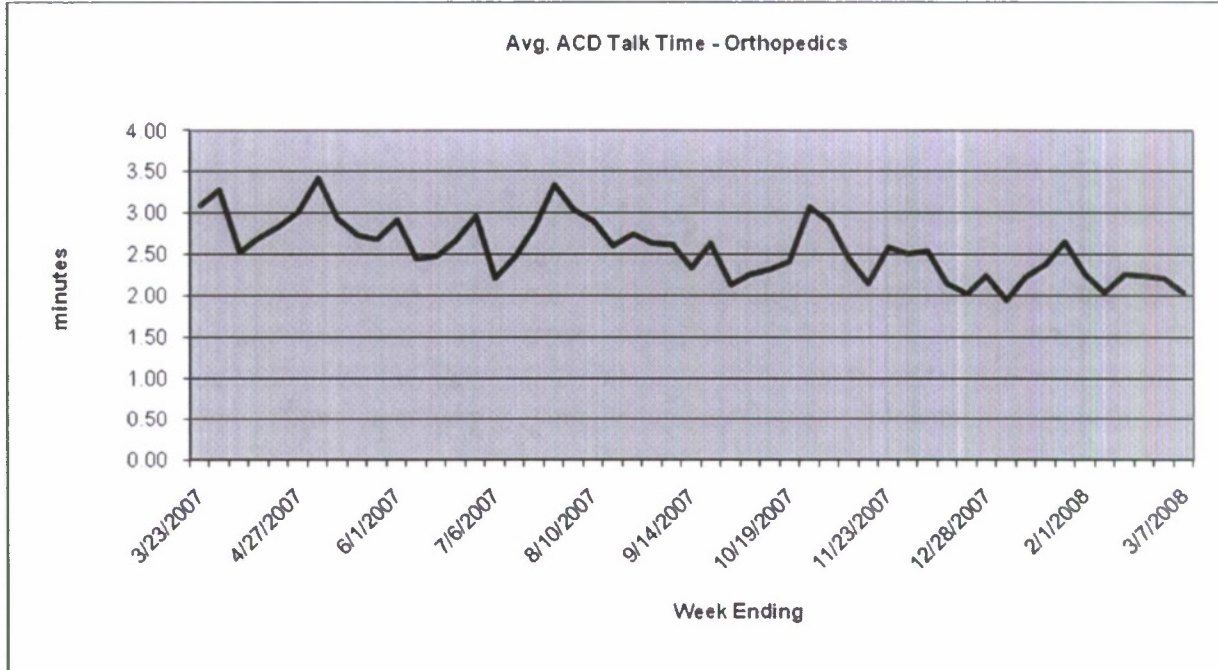
## Phone System Summary for Orthopedic Clinic



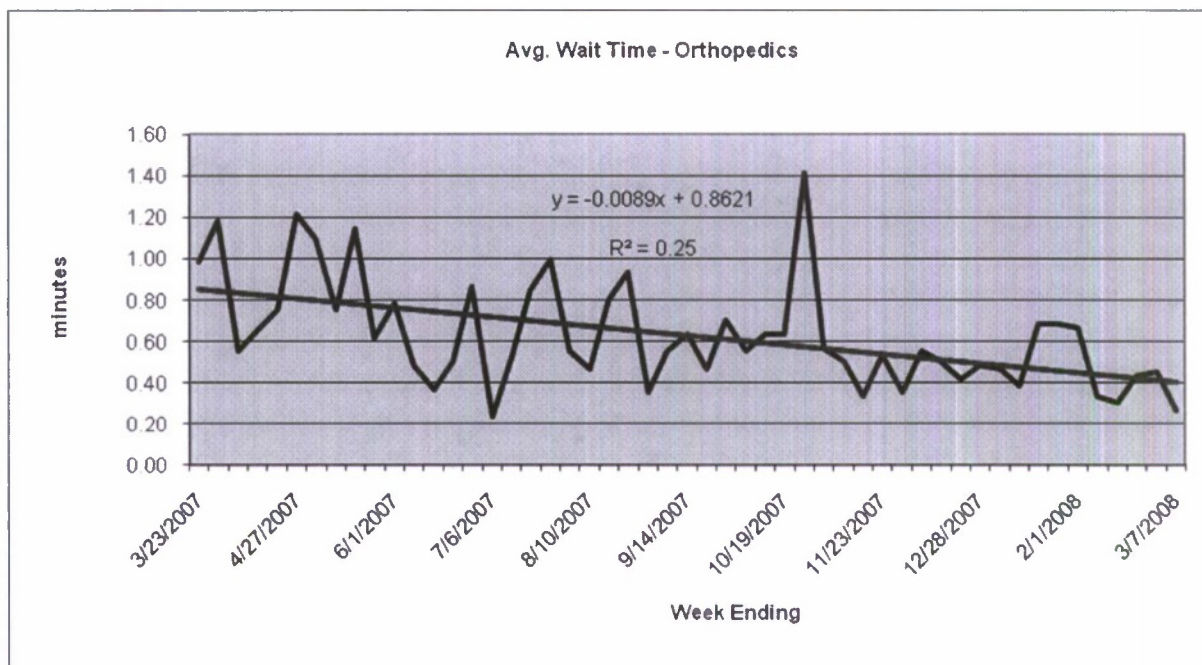
## Appendix I



## Phone System Summary for Orthopedic Clinic



## Phone System Summary for Orthopedic Clinic



## Appendix J

# Regression analysis of the appointing processes at the 121 CSH

## Regression analysis for clinics using the centralized appointing process

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.940	1	.940	2.969	.088 <sup>a</sup>
	Residual	32.280	102	.316		
	Total	33.220	103			

a. Predictors: (Constant), Num.Received b. Dependent Variable: Avg.Answer.Delay

## Regression analysis for specialty clinics not using the centralized appointing process

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	21140.871	1	21140.871	86.402	.000 <sup>a</sup>
	Residual	49425.286	202	244.680		
	Total	70566.157	203			

a. Predictors: (Constant), Num.Received.ACC b. Dependent Variable: Avg.Answer.Delay.ACC